

Project document

Information and Communication Technology (ICT) for development of small and medium-sized exporters in East Asia: Republic of Korea

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IDE-JETRO

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Abstract

Within Asia, the Republic of Korea has been hailed as a successful model economy in IT development (see table 1). This does not mean, however, that Korean firms are exempt from the digital divides found elsewhere. The Korean government has been working assiduously to improve the environment and infrastructure so that SMEs can use IT more actively and effectively in their businesses. The Korean government has been successful in some of its policies and measures in this area, but the overall success of such efforts has not measured up to the resources the government has devoted to the task. The purpose of this study is to review and analyse the use of IT by Korean SMEs, in order to identify what factors facilitate or hinder their attempts to digitise, thus providing guidance for the formulation of government policies and assisting the private sector's efforts in this area.

I. Introduction

One of the core components of the knowledge-based economy is the role of information technology (IT) as a facilitator of production, dissemination and utilisation of knowledge. In this context, many economies have been promoting IT development as a priority national strategy. However, in addition to the international digital divide between developed and developing economies, there continue to be many types of digital divides within given economies. The digital divide between SMEs and large firms is one example of this. Even among small and medium-sized enterprises (SMEs), digital divides exist.

Within Asia, the Republic of Korea (hereafter Korea) has been hailed as a successful model economy in IT development (see table 1). This does not mean, however, that Korean firms are exempt from the digital divides found elsewhere. The Korean government has been working assiduously to improve the environment and infrastructure so that SMEs can use IT more actively and effectively in their businesses. The Korean government has been successful in some of its policies and measures in this area, but the overall success of such efforts has not measured up to the resources the government has devoted to the task.

The purpose of this study is to review and analyse the use of IT by Korean SMEs, in order to identify what factors facilitate or hinder their attempts to digitise, thus providing guidance for the formulation of government policies and assisting the private sector's efforts in this area.

TABLE 1
E-READINESS RANK, 2003

	Evaluation point	Rank
Sweden	8.67	1
Netherlands	8.43	3
United States	8.43	3
United Kingdom	8.43	3
Australia	8.25	9
Republic of Korea	7.80	16
Taiwan Province of China	7.41	20
Japan	7.07	24

Source: Economist Intelligence Unit. 2004. E-Readiness Rankings 2003.

Note: Evaluation point is a maximum of 10.0.

The paper consists of several sections: Section II deals with the present status of IT markets and IT usage by SMEs in Korea. Section III considers the relationship between IT development and SMEs. Section IV focuses on the Korean government's IT policies in the interrelated areas of SMEs, IT and international trade. Section V deals with the network aspect. And Section VI discusses the lessons from each section and derives overall implications of the Korean case for the country and for other developing economies.

II. Present status of IT market and IT usage by SMEs

A. IT industry and markets in Korea

1. Status of the Korean IT industry

Korea's IT industry witnessed impressive growth in the 1990s. Production doubled from 88 trillion won in 1998 to 209 trillion won in 2003. The value added of the IT industry rose 30.4% in 1999 and 26.3% in 2000. The growth rate of the value added for the IT industry was only 3.2% in 2001 due to the economic downturn, but the pace picked up again in 2002 to approximately 25.9%. The IT industry has accounted for increasingly higher shares of GDP, rising from 8.6% in 1997 to 15.6% in 2003. The Korean IT industry has managed to overcome the limitations of the domestic market by finding growth opportunities in overseas markets. Approximately 40% of IT production is exported overseas. The total export volume of the IT industry was US\$ 57.8 billion in 2003, or roughly 30% of Korea's total exports for the year, indicating that IT has become one of the major growth engines for the Korean economy.

2. IT industry's contribution to the Korean economy

When examining the contribution of IT by analysing growth factors according to production element, the industry's contribution to economic growth is found to have risen steadily from 6.2% in the late 1980s to 11.4% and 23.4% in the early and late 1990s, respectively. Moreover, despite the serious impact of the financial crisis in 1997, IT investment and IT industry productivity showed robust growth in the late 1990s, far surpassing the levels seen in the first half of the decade (see table 2).

The growth rate of IT was unmatched by any other industry. Although this would be the most obvious reason for the IT industry's high contribution to Korea's real economic growth rate, the high value added ratio of the ICT service and software sector, along with a gradual drop in the prices of IT products and services, resulted in a surge in real value added that exceeded the nominal growth (see table 3).

TABLE 2
GROWTH IN IT INDUSTRY PRODUCTION AND ITS SHARE OF GDP (1997-2003)

	1997	1998	1999	2000	2001	2002	2003
Production (<i>trillion won</i>)	76.0	88.0	115.0	145.0	150.0	189.1	208.8
Share of GDP (%)	8.6	9.3	11.2	13.1	12.9	14.9	15.6
Contribution to growth (%)	37.6	-23.8	32.8	46.8	44.3	30.4	41.5

Source: Korea Information Strategy and Development Institute (KISDI), 2003; National Computerisation Agency, 2004.

TABLE 3
SHARE OF SUB-SECTOR IN THE IT INDUSTRY
(In percentages)

	1996	1997	1998	1999	2000	2001/1 st Q
Telecommunications services	24.9	22.6	20.3	18.9	20.2	20.9
IT equipment	70.6	72.8	74.4	75.5	74.2	72.6
S/W & computer-related services	4.5	4.6	5.3	5.7	5.6	6.6

Source: Korea Information Society Development Institute (KISDI), 2002, IT Industry Outlook of Korea 2002.

This circumstance was made possible by the optimal combination of domestic-market expansion and increases in global IT demand. The global increase in IT demand resulting from technology innovations in computers, the Internet and mobile communications meant that there were far greater opportunities for the Korean IT industry on the global market, especially in manufacturing.

The domestic market expanded as a result of the rapid adoption of mobile communications services, high penetration of Internet access, and the proliferation of dot-com companies. Government policies further stimulated the advancement of the IT industry. Demand for IT was driven by deployment of high-speed information communication networks and public policies for wider access to information and the Internet. The introduction of competition into the communications services market encouraged more private investment in IT, lower prices, and improved quality, thus promoting expansion of the market.

3. IT trade

IT-industry exports in Korea increased from US\$ 9.2 billion in 1990 to US\$ 38.5 billion in 2001. At the same time, imports increased from US\$ 7.5 billion in 1990 to US\$ 27.3 billion in 2001, recording a continuing surplus in the sector's trade balance. The IT industry's trade surplus has grown rapidly, especially after the economic lethargy of 1997, to US\$ 11.2 billion in 2001 from US\$ 9.4 billion in 1997. Major export items of the Korean IT industry include memory semiconductors, mobile telephones, monitors, LCDs, PCs and satellite broadcast receivers, while major import items include non-memory semiconductors, transmission equipment and large computers. Since IT exports far exceeded imports, Korea has maintained a trade surplus in the sector (see table 4).

TABLE 4
KOREAN IT INDUSTRY IMPORTS AND EXPORTS
(In hundred million dollars)

	1997	1998	1999	2000	2001
Exports	313	305	400	512	385
Imports	219	183	265	355	273
Balance	94	122	134	157	112

Source: Korea Information Strategy and Development Institute (KISDI).

4. IT equipment production

According to the industrial classification of the Ministry of Information and Communication, Korea's IT equipment industry consists of four sectors: communication equipment (including communication terminals and switchboards), information equipment (including computers and peripherals), broadcasting equipment (including satellite broadcasting receivers), and the components industry (including semiconductors and LCDs).

In 2000, the Korean IT equipment industry held a 74% share of the entire IT industry in terms of production. Fifty-five percent of total IT equipment production was exported to overseas markets. Production and domestic sales of the IT equipment industry now lead the world in several products, such as semiconductors, CDMA mobile phones/systems, LCDs, digital televisions and PDAs.

Production of several items accounts for a particularly high share of total production in the Korean IT equipment industry. In 2000, the share of mobile handset, PCs and peripherals, semiconductors and LCDs in Korea's IT equipment industry reached 11.9%, 11.1%, 37.1% and 5.5%, respectively, with the sum of these sectors totalling 65.6%. Moreover, the share of these sectors in exports reached as high as 76.6%. On the other hand, network equipment, such as routers and non-memory semiconductors, are highly dependent on imports. The intermediary input ratio for imports in Korea's IT industry exceeds the average for all manufacturing industries.

Exports from Korea's IT industry represented US\$ 51.2 billion in 2000, accounting for 29.7% of total exports for all industries. The major export products include semiconductors, mobile phones, LCDs, PCs, monitors and optical/hard disc drives. Exports of mobile phones totalled US\$ 5.5 billion in the year. Specifically, the CDMA mobile phone sector in Korea has been extremely competitive, with more than a 50% share in the international market. PCs account for more than a 5% share of Korea's IT exports. Exports of LCDs amounted to US\$ 2.7 billion in 2000, a 1.6% share of total exports and 5.4% of IT equipment exports.

Table 5 shows that the total production in IT equipment increased to 143.6 trillion won in 2003 from 86.8 trillion won in 1999. The proportion of IT components, the highest category, increased from 50.3 trillion won to 80.4 trillion won during the same period. Table 6 shows that IT equipment exports increased from US\$ 39.9 billion in 1999 to US\$ 57.2 billion in 2003.

Korean companies have become sufficiently competitive internationally to be major exporters in the world markets of mobile phones and networking equipment. Korean conglomerates like Samsung Electronics and LG Electronics have replaced international giants to become the major vendors for mobile phones and telecom equipment orders from Korean mobile telecom service providers. Korean venture companies also have gained a market share in some niches of the smaller network equipment market since the 1998 economic crisis. This home-grown competitiveness helped them turn to overseas market as their next destination for marketing networking equipment and mobile phones.

TABLE 5
PRODUCTION OF IT EQUIPMENT
(In trillion won)

	1999	2000	2001	2002	2003
Total	86.8	105.9	99.1	126.5	143.6
Telecommunication equipment	20.0	22.5	25.2	32.1	36.7
Information equipment	15.7	20.9	18.7	24.0	22.0
Broadcasting equipment	0.9	1.6	2.0	3.7	4.5
IT components	50.3	60.9	53.2	66.7	80.4

Source: Korea Association of Information and Telecommunication, 2004.

TABLE 6
EXPORT OF IT EQUIPMENT
(In million dollars)

	1999	2000	2001	2002	2003
Total	39 897	51 032	38 241	45 966	57 165
Telecommunication equipment	6 046	8 259	10 373	13 354	18 417
Information equipment	7 267	9 531	7 672	9 401	10 474
Broadcasting equipment	343	734	809	962	2 362
IT components	26 241	32 508	19 387	22 249	25 912

Source: Korea Association of Information and Telecommunication, 2004.

In spite of their rapid growth, Korean companies lag behind world-leading multinational corporations (MNCs) in overall competitive standings in the IT equipment market. First, Korean concentration of product portfolios on small-sized units and access edge has led them to generate low value added and limited sales revenues. Second, most of these small and medium-sized venture companies lack basic technology and strong global positioning, thus denying them economies of scale.

5. Software industry

Software production consists of four types: Package software, computer-related service, digital content development service and database production. As shown in table 7, the computer-related service predominates, with database production accounting for the smallest share. There are no significant differences between production and domestic demand, except for digital content. Table 8 shows that Korea not only exports, but also imports software every year.

TABLE 7
SOFTWARE PRODUCTION & DOMESTIC CONSUMPTION
(In thousands of U.S. dollars)

		1999	2000	2001	2002	2003p
Package SW:	A	12 396	20 173	34 892	50 947	55 914
	B	15 676	25 357	40 566	56 685	60 753
Computer-related service:	A	50 168	81 486	103 952	119 461	115 173
	B	50 091	80 999	103 503	119 400	114 633
Digital content development service:	A	2 047	4 695	7 298	9 248	9 217
	B	2 280	4 362	5 876	7 905	7 564
Database production and retrieval agent:	A	375	962	1 126	2 572	2 888
	B	375	956	1 119	2 567	2 852
Total:	A	64 987	107 316	147 268	182 228	183 193
	B	68 422	111 674	151 064	186 558	185 802

Source: Korea Association of Information and Telecommunication, 2004.

Note: A=Production, B=Domestic Consumption, P=Preliminary

TABLE 8
SOFTWARE EXPORT & IMPORT
(In thousands of U.S. dollars)

		1999	2000	2001	2002	2003p
Package SW:	Export	22 458	37 506	74 499	79 228	57 529
	Import	298 192	495 994	514 055	536 415	432 367
Computer-related service:	Export	34 801	88 871	121 647	110 094	115 282
	Import	28 309	45 757	86 827	105 291	73 489
Digital content development service:	Export	3 551	38 600	114 899	112 187	128 393
	Import	23 120	9 134	4 762	58	7 564
Database production and retrieval agent:	Export	24	564	660	2 758	2 798
	Import	27	80	127	2 349	2 852
Total:	Export	60 834	165 541	311 705	304 267	304 002
	Import	349 648	550 965	605 771	649 203	516 272

Source: Korea Association of Information and Telecommunication, 2004.

Note: P=Preliminary

6. Level of informatisation

The trends in, and level of, informatisation (i.e. the use of information technology and services) in Korea can be appreciated by looking at the indicators summarized in table 9.

TABLE 9
INFORMATISATION STATUS IN KOREA

Classification	1998	1999	2000	2001	2002	2003
Broadband Internet subscribers (1,000 households)	14	374	4 010	7 810	10 400	11 180
Internet users (1,000 people)	3 100	10 860	19 040	24 380	26 270	29 220
Internet usage rate (%)	-	22.4	44.7	56.6	59.4	65.5
Number of PCs (1,000 sets)	8 270	11 530	18 615	22 495	23 502	26 741
PC penetration rate for total population (%)	-	24.7	39.6	47.5	49.3	55.8
Mobile phone subscribers (1,000 people)	-	23 443	26 816	29 046	32 342	33 592
Mobile phone subscribers (per 100 inhabitants)	-	50.29	57.05	61.35	67.89	70.09
E-commerce:						
- Transaction volume (billion won)	-	-	57 558	118 980	177 810	235 025
- Rate (%)	-	-	4.5	9.1	12.8	16.5
Internet banking users (1,000 people)	-	1 230	4 090	11 310	17 710	22 754
Electronic signature users (1,000 people)	-	-	52	1 918	5 772	8 713
IT export (% to total exports)	-	27.8	29.7	25.6	28.5	29.5

Source: National Computerisation Agency (NCA), 2004, Informatisation White Paper 2004.

7. Broadband Internet subscribers

As of December 2002, a mere four years after broadband Internet services were first introduced in Korea, approximately 1.06 million households had broadband access. Korea has the highest broadband penetration rate in the world. The number of broadband Internet subscribers was 11.2 million households and the household penetration rate was 73.1% in 2003. Ninety-eight percent of all towns and villages in Korea have access to broadband services.

8. Internet users

Since the first commercial service in 1994, the total number of Internet users in Korea has rapidly increased. As of 2003, 29.22 million people, or 65.5% of the population, were using the Internet. By June 2002, 40.7% of all businesses in Korea that employed more than five workers had a corporate network infrastructure. Seventy-one-point-one percent of all businesses had available Internet services within their vicinity.

9. Installation of network infrastructure

Among industrial sectors, the financial industry, with an 86.3% rate of installed network infrastructure, ranked first. Heavy industry's installation rate was 40.6%, the second highest. The agriculture sector had the lowest rate of 26.6% (see table 10).

As shown by table 11, larger firms tend to install network infrastructure more than smaller firms. Firms with more than 1,000 employees showed an installation rate of approximately 99%, whereas firms with less than 10 employees registered 27%.

TABLE 10
INSTALLATION RATE OF NETWORK INFRASTRUCTURE
BY INDUSTRIAL SECTOR
(In percentages)

Industry	Installation rate
Agriculture	26.6
High tech industry	28.1
Heavy industry	40.6
Petrochemical industry	27.8
Construction industry	34.9
Distribution industry	30.4
Finance industry	86.3
Other services	51.2

Source: White Paper Internet Korea 2002, National Computerisation Agency (NCA), 2002.

TABLE 11
INSTALLATION RATE OF NETWORK INFRASTRUCTURE
BY SIZE OF COMPANIES
(In percentages)

Size (number of employees)	Installation rate
5-9	26.8
10-49	54.6
50-299	78.3
300-999	93.0
More than 1,000	99.2

Source: White Paper Internet Korea 2002, National Computerisation Agency (NCA), 2002.

10. PC usage

The number of PCs in use in 2003 was 26.7 million sets, and the penetration rate was 55.8%, representing a doubling during the past five years.

11. Homepage use by industrial sector

Companies having homepages, by industrial sector, is summarized in table 12. The heavy industry, chemical industry and financial sectors show high rates (table 12). The rate of homepages increases as the size of the firm increases (see table 13).

TABLE 12
RATE OF COMPANIES WITH HOMEPAGES BY INDUSTRY (2003)
(In percentages)

	Ratio of companies	
	With homepages	In the networks of holding companies
Agricultural	19.7	11.7
Light industry	25.5	4.6
Heavy industry	34.0	4.2
Chemical industry	38.4	6.0
Construction	15.3	1.9
Distribution	19.5	14.0
Finance	30.6	53.6
Other services	37.2	19.0

Source: White Paper Internet Korea 2003, National Computerisation Agency (NCA), 2003, Survey on Informatisation Statistics 2003.

TABLE 13
RATE OF COMPANIES WITH HOMEPAGES BY SIZE (2003)
(In person, percentages)

	Ratio of companies	
	With homepages	In the networks of holding companies
5-9	19.4	3.3
10-49	35.2	16.2
50-299	59.8	14.2
300-999	76.0	13.3
More than 1000	81.9	14.8

Source: White Paper Internet Korea 2003, National Computerisation Agency, 2003, Informatisation Statistics 2003.

12. Mobile Internet

Korea's mobile communications services are represented by mobile phone services including PCS, cellular phone services (representing 98.7% of all mobile communications services), telecommunication relay service (TRS), wireless data communications and paging services. As of June 2004, the number of mobile phone subscribers was 36.24 million people or 75.2% of the population. The number of mobile Internet subscribers was 34.53 million people.

The size of Korea's mobile Internet market increased from 587.4 billion won in 2001 to 1.2 trillion won in 2002 and 2.1 trillion won in 2003. In 2003, this revenue represented 13.4% of total mobile communications service revenue. This explosive growth is due to continuous development of a variety of mobile content, as the network evolves to CDMA 2000-1x EV-DO.

13. Wireless Internet

The wireless Internet market grew into a one trillion-won market in 2001. Wireless Internet services are offered through networks owned by wireless carriers. The first wireless Internet services were offered in 1999, and demand rapidly grew into a market that offers video on demand (VOD) and multimedia messaging services (MMS) in 2003. The market was expected to double in size in 2003. As revenues in wireless Internet services increased, content and solution companies related to the wireless market also performed well.

Dacom, Hanaro Telecom and SK Telecom, which are integrated wireless and fixed line carriers, entered the web portal business through their sheer marketing and brand power and based on their access to massive budgets. Telecoms introduced online shopping services and a variety of types of content by utilizing their own networks and offering advertising packages using their integrated wireless and fixed line resources, in efforts to aggressively enter the web portal business.

Approximately 27.7 million devices with wireless Internet capability were in use in September 2002. Among mobile phone users, 93.1% were aware of wireless Internet services, based on a survey conducted in September 2002. Thirty-two-point-three percent of mobile phone users also use wireless Internet services, representing a 4.9% increase from March 2002.

Total revenues from Internet businesses in Korea grew to approximately 94 trillion won in 2002, an 18% increase over the previous year. In 2001, Internet businesses had total revenues of 77 trillion won. Over 270,000 people were employed in Internet businesses in 2002, constituting a 7.4% increase over the previous year.

Dot-com companies are developing new business models capable of succeeding under the current favourable market conditions, such as the large Internet user population base and first-rate telecommunications infrastructure. However, deregulation across wireless Internet networks, partnerships between the media and telecommunication companies, and the merging of online and conventional business operations will create new market forces, transforming the business environment and placing pressure on management.

14. Main Internet connections types and speeds

Among the 314,000 firms in Korea, 62.7% used ADSL-based services to access the Internet as of July 2002, while 21.9% used leased lines. Larger firms tended to use leased lines and, overall, more firms are logging onto the Internet. Sixty-eight-point-one percent of all firms that have Internet access use services with average Internet connection speeds of more than 2 Mbps.

B. E-business

1. E-commerce

Table 14 shows the rate of e-commerce by industry, in descending order, indicating services, including communications, with high rates. According to table 15, larger firms, with more than 300 employees, utilize e-commerce much more than SMEs with less than 300 employees.

TABLE 14
IMPLEMENTATION RATE OF E-COMMERCE BY INDUSTRIAL SECTOR
(In percentages)

Industry	Rate
Communications	64.7
Education services	62.9
Electricity, gas & water supply	62.9
Public administration	62.5
Construction	42.0
Health & social work	31.3
Public repair & personal services	21.2
Wholesales & retail	18.0
Recreation, culture, & sports services	12.1
Business services	12.1
Hotels & restaurants	10.4
Real estate & leasing	9.8
Transportation	7.6
Manufacturing	6.9

Source: Korea Institute for Electronic Commerce, 2004, E-Business White Paper 2004.

TABLE 15
IMPLEMENTATION RATE OF E-COMMERCE BY NUMBER OF EMPLOYEES
(In percentages)

System	Number of companies	Implement-ation of e-commerce	System constructed by		Network model	
			The company	Others	Open	Closed
Total	2 044	20.8	6.3	15.0	18.6	2.9
More than 300 employees	159	29.8	13.5	17.2	25.4	7.2
Under 300 employees	1 585	18.1	4.2	14.4	16.7	1.7

Source: Korea Institute for Electronic commerce, 2004, E-Business White Paper 2004.

2. Domain and website

The total number of websites registered in 2000 was 220,085. Of these, 88,663 websites were in operation, and only 7,951 websites (9%) actually engaged in e-commerce.

The number of websites by e-commerce type is shown in table 16; B-to-C and B-to-B e-commerce predominates.

TABLE 16
STATUS BY E-COMMERCE WEBSITE
(In number of websites)

Total number of websites	Number of websites in		B-to-B	B-to-C	C-to-C	Other
	Operation	EC business				
220 085	88 663	7 951 (9%)	3 089 (38.9%)	4 694 (59%)	383 (1.6%)	114 (0.5%)

Source: National Statistical Office, 2004, Survey Reports on E-Commerce Statistics.

Note: Some firms are involved in multiple activities.

B-to-B e-commerce dominates, in terms of transaction amount, with 87.6% of the total in 2002 and 88.0% in 2003 (see table 17).

TABLE 17
E-COMMERCE BY TRANSACTION PARTNER
(In billions of won)

	2002		2003		Change over the previous year	Rate of Change (%)
	Volume	Composition (%)	Volume	Composition (%)		
Total	177 810	100	235 025	100	57 215	32.2
B-to-B	155 707	87.6	206 854	88.0	51 147	32.8
B-to-G	16 632	9.4	21 634	9.2	5 002	30.1
B-to-C	5 043	2.8	6 095	2.6	1 052	20.9
Others	427	0.2	442	0.2	15	3.5

Source: National Statistical Office, 2004, Survey Reports on E-Commerce Statistics.

In the case of SMEs, B-to-B dominates, as shown in table 18.

TABLE 18
E-COMMERCE OF SMES (MANUFACTURING ONLY)

	Weighted number of companies using (%)	E-commerce sales (100 million won)				Percentage of total sales
		Total	B-to-B	B-to-C	G-to-B	
2002	3.5	30 922	52.3	31.3	15.9	1.25
2003	4.0	37 535	59.3	25.9	14.8	1.40

Source: Small and Medium Business Administration (SMBA) and KFSMB, 2004, Survey on Current State of SMEs 2003.

The e-commerce market in Korea grew rapidly, reaching 50 trillion won in the first half of 2001. According to an OECD survey in 2001, 15% of Korean consumers are online buyers. The level of IT usage among SMEs in Korea, which represent 99.2% of companies in the country, is considered quite low. According to a report from Korea's NCA (National Computerisation Agency) in 2001, the ratio of e-commerce to the total transactions of SMEs is approximately 10%, and the level of informatisation among SMEs is also very low.

Korea's total e-commerce volume in 2003 was 235.025 trillion won, an increase of 57.215 trillion won, or 32.2%, over the previous year. In relation to national transaction volumes, e-commerce volume increased to 16.5% from 12.8% in 2002, indicating that e-commerce is expanding rapidly.

3. B-to-B

According to a survey of cyber shopping malls conducted by the Small & Medium Business Administration (SMBA) in February and March of 2003, the total of e-commerce transactions in Korea in the 1st quarter in 2003 was 53 trillion won. Of this, B-to-B e-commerce represented 47.3 trillion won, a 34.5% increase over the same period of the previous year. E-commerce in manufacturing was 33.6 trillion won, 70.5% of the total of B-to-B e-commerce (see tables 19, 20 and 21).

TABLE 19
B-TO-B E-COMMERCE VOLUME
(In billions of won)

	2002		2003		Change over the previous year	Rate of change (%)
	Volume	Composition (%)	Volume	Composition (%)		
Total	155 707	100	206 854	100	51 147	32.8
Customer Led	113 254	72.7	150 688	72.8	37 434	33.1
- Open Type	23 281	(20.6)	34 270	(22.7)	10 989	47.2
- Cooperative Type	89 973	(79.4)	116 418	(77.3)	26 445	29.4
Seller Led	36 509	23.5	48 766	23.6	12 257	33.6
- Open Type	4 431	(12.1)	6 279	(12.9)	1 848	41.7
- Cooperative Type	32 078	(87.9)	42 487	(87.1)	10 409	32.4
Broker Led	5 945	3.8	7 400	3.6	1 455	24.5

Source: National Statistical Office, 2004, Survey Reports on E-Commerce Statistics.

TABLE 20
B-TO-B E-COMMERCE BY LOCATION OF TRANSACTION PARTNERS
(In billions of won)

	2002		2003		Change over the previous year	Rate of change (%)
	Volume	Composition (%)	Volume	Composition (%)		
Total	155 707	100	206 854	100	51 147	32.8
Between domestic companies	129 697	83.3	172 788	83.5	43 090	33.2
With foreign companies	26 010	16.7	34 066	16.5	8 056	31.0

Source: National Statistical Office, 2004, Survey Reports on Statistics of E-Commerce.

TABLE 21
B-TO-B E-COMMERCE BY INDUSTRY
(In billions of won)

	2002		2003		Change over the previous year	Rate of change (%)
	Volume	Composition (%)	Volume	Composition (%)		
Total	155 707	100	206 854	100	51 147	32.8
Manufacturing	117 974	75.8	146 162	70.7	28 189	23.9
Electricity, Gas, Water	1 070	0.7	2 289	1.1	1 219	114.0
Construction	5 774	3.7	9 664	4.7	3 890	67.4
Wholesale, Retail Trade	25 730	16.5	41 117	19.9	15 387	59.8
Transport, Communication	3 721	2.4	4 690	2.3	969	26.0
Other Services	1 438	0.9	2 931	1.4	1 492	103.8

Source: National Statistical Office, 2004, Survey Reports on E-Commerce Statistics.

The B-to-B e-commerce volume for 2003 was 206.854 trillion won, a 32.8% increase over the previous year. Customer-led e-commerce was 150.688 trillion, 72.8% of all B2B e-commerce transaction, a 33.1% increase over the previous year. Seller-led e-commerce was 48.766 trillion, representing an increase of 33.6%. Of this, cooperative transactions constituted 42.487 trillion, or 87.1% of all seller-led transactions. Broker-involved transactions amounted to 7.4 trillion won, a small proportion, at 3.6%, but steadily increasing. As shown by the statistics, customer-led transactions dominate the B2B market, but seller-led transactions are increasing. This indicates that the market-oriented transactions, such as e-market place, are steadily replacing transactions through the existing purchase line. There were 260 e-market sites, of which international trade-related sites numbered 37, followed by electronics at 32, machinery and industrial material at 31, and MRO (maintenance, repair, operation) at 24. Total volume was 7.4 trillion won, with MROs accounting for the greatest portion, with 2.182 trillion won.

4. B-to-C

Tables 22-25 show major statistics concerning B-to-C transactions in Korea in the recent period. The Korean B-to-C market grew at an astounding rate in 2002. In the 4th quarter of 2002, revenues in the B-to-C market reached 1.4 trillion won, a 75% increase compared to the previous year. The B-to-C market in 2002 had a 4% market share of the 122 trillion-won consumer retail market. The high growth rate of the B-to-C market and its increasing market share in the retail business produce a major impact on the retail market.

The most popular category in B-to-C transactions was accessories (shoes, bags, wallets, purses, etc). Following, in second place, was music, and then books, clothes, home appliances and PC hardware, in that order. In terms of revenue, home appliances and PC hardware were the top categories in the B-to-C category. General e-retailers that sell a wide selection of products have taken market share away from small specialty e-retailers. These trends have emerged after revenues at leading general e-retailers posted a substantial increase while many specialty e-retailers expanded their product offerings.

As of the end of the 1st quarter of 2003, the number of cyber shopping mall companies was 3,188. This constitutes a 36.6% increase over the same period in the previous year. In July 2003 the number reached 3,399.

The total number of shopping mall transactions in July 2003 was 570 billion won, a 3.5% increase over the previous month. Of this, B-to-C transactions accounted for 501 billion won. In the 1st quarter of 2003, the total for shopping mall transactions was 1.7 trillion won. Of this, 85.2% was B-to-C, with B-to-B accounting for 7.9%.

TABLE 22
B-TO-C MARKET
(In ten billion won)

	2001				2002				2003			
	1/4	2/4	3/4	4/4	1/4	2/4	3/4	4/4	1/4	2/4	3/4	4/4
Revenues	525	588	656	811	1 104	1 236	1 283	1 420	1 467	1 642	1 517	1 648

Source: National Computerisation Agency, Ministry of Information and Communication, 2003, White Paper Internet Korea 2003.

TABLE 23
E-RETAILER TRANSACTION RATIO BY PRODUCT CATEGORY
(In ten billion won, percentages)

	CDs/ Books	Clothes	Electronic equipment	Computer accessories	Food	Leisure goods	Children's goods	Tickets
Korea Click	21.2	16.6	10.6	7.1	2.8	1.3	0.8	2.3
NSO	6.3	8.3	17.9	14.7	3.1	3.3	2.4	5.7

Source: National Computerisation Agency, Ministry of Information and Communication, 2003, White Paper Internet Korea 2003.

TABLE 24
CYBER SHOPPING MALL TRANSACTION VOLUME
(In billions of won)

	2002		2003		Change over the previous year	Rate of Change (%)
	Volume	Composition (%)	Volume	Composition (%)		
Total	6 029.9	100	7 054.8	100	1 024.9	17.0
B-to-C	5 043.4	83.6	6 095.0	86.4	1 051.6	20.9
B-to-B	560.5	9.3	518.0	7.3	-41.4	-7.4
Others	427.1	7.1	441.9	6.3	14.9	3.5

Source: National Statistical Office, 2004, Survey Reports on E-Commerce Statistics.

TABLE 25
NUMBER OF ONLINE SHOPPING MALLS
(In number of)

Classification	2001	2002	2003
Number of sites	2 166	2 896	3 358
Merchandise:			
- General mall	320	402	343
- Specialized mall	1 846	2 494	3 015
Operation:			
- Online only	690	1 111	1 367
- On/off line combined	1 476	1 785	1 991

Source: National Statistical Office, 2004, Survey Reports on E-Commerce Statistics.

Total transaction volume through online shopping malls in 2003 was 7.1 trillion won, an increase of 17.0% (1.02 trillion) over the previous year. Of this, the B-to-C volume was 6.1 trillion won, or 86.4% of the total, while B-to-B accounted for 5.2 trillion won, or 7.3%.

TABLE 26
NUMBER OF E-MARKET PLACES AND TRANSACTION VOLUME (2003)
(In billions of won, percentages)

	Number of Sites		Transaction Volume	
	Number	Share	Volume	Share
Chemical	20	7.7	1,124	15.2
Construction (material)	16	6.2	1,362	18.4
Agricultural	22	8.5	609	8.2
Steel	9	3.5	697	9.4
Textiles & Clothing	12	4.6	11	0.1
Trading	37	14.2	187	2.5
Medicine	11	4.2	337	4.6
Petrochemical	5	1.9	432	5.8
Machinery	31	11.9	113	1.5
MRO	24	9.2	2 182	29.5
Electronics	32	12.3	313	4.2
Others	41	15.8	34	0.5
Total	260	100	7 400	100

Source: National Statistical Office, 2004, Survey Reports on E-Commerce Statistics.

5. G-to-B

Tables 27 and 28 show statistics on G-to-B transactions in Korea. G-to-B is e-commerce activity between the government and the private sector, and consists primarily of government procurement, administration services, and the issuing of certified government papers. The government has expanded e-Procurement in 2002 to achieve the goal of establishing e-government. After the government completed construction of a G-to-B system and approved regulations governing the service, the G-to-B market has expanded in scope and scale.

TABLE 27
G-TO-B MARKET BY TYPE OF COMMODITIES
(In billions of won)

	Total	Consum-ables	Furniture	Equipment, tools	Materials	Other tangible goods	S/W	Other services
Purchasing amounts	8 411	351	410	1 233	3 604	2 604	115	94
Composition (%)	100	4.2	4.9	14.7	42.8	31.0	1.4	1.1

Source: National Statistical Office, 2004, Survey Reports on E-Commerce Statistics.

The G-to-B market in Korea had revenues of 3.0 trillion won in the 4th quarter of 2001. As of the 4th quarter of 2002, the revenues in G-to-B transactions reached 6.2 trillion won. Since the Government e-Procurement System (GePS) went into operation, 33,109 contracts, out of a total of 34,773 government contracts, were open for bidding over a span of three months, starting in October 2002.

TABLE 28
G-TO-B MARKET
(In billions of won)

	2002		2003		Change over the previous year	Rate of change (%)
	Volume	Composition (%)	Volume	Composition (%)		
Total	16 632	100	21 634	100	5 002	30.1
Material and service purchases	6 792	40.8	8 411	38.9	1 619	23.8
Construction projects	9 840	59.2	13 223	61.1	3 383	34.4

Source: National Statistical Office, 2004, Survey Reports on E-Commerce Statistics.

Among the commodities that were exchanged in G-to-B transactions, the purchasing of supplies amounted to 986 billion won, representing more than 46.4% of the entire G-to-B market. Miscellaneous purchases by the government grew from a 12.2% share in the 2nd quarter of 2001 to a 25.7% share of G-to-B transactions in the 4th quarter of 2002. The increasing share of miscellaneous purchases in G-to-B transactions indicates that the variety of goods and services that the government procures has increased.

The National Electronic Procurement System has dealt with all government procurement procedures online and provided a one-stop procurement service since September 2002. The system is being used by all central administrations, local governments and government-owned companies, and has functioned flawlessly. Through the system, transparency of government purchases has been improved, and efficiency and service levels have increased dramatically, as shown by the reduction in payment time from 14 days to several hours. The Ministry of Information and Communication has recently decided to increase its effort for international cooperation and has been discussing with Thailand their online procurement pilot system. Total volume of online G-to-B transactions of the central and local government was 21.6 trillion won in 2003, an increase of 5.0 trillion won, or 30.1%, over the previous year. In terms of the merchandise involved in G-to-B transactions, materials represented the largest portion, with 42.8% (3.6 trillion won), followed by tangible products, at 31.0% (2.6 trillion won), and equipment and machinery, at 14.7% (1.2 trillion won). Materials showed the largest volume, as their codes or models were standardized. Service items requiring customisation, which are difficult to standardize, showed very low volumes.

The total volume of construction project contracts through electronic bidding was 13.2 trillion won in 2003. Of this, civil construction took in 61.9% of the total (or 8.2 trillion won), followed by architectural, at 21.4% (or 2.8 trillion won), and others, at 9.3% (or 1.2 trillion won). Civil construction projects showed the highest volume, since the projects tended to be large in scale and the government is encouraging electronic bidding for construction projects. It is expected that G-to-B transactions will continue to increase as online bidding expands.

6. Internet banking

Internet banking, first introduced in 1999, reached 22.75 million users in 2003. Electronic billing and payment systems, such as payment of taxes, penalties or levies through CD/ATD or the Internet, expanded. As of the end of July 2003, 14 banks and post offices consolidated account management service. Other credit card companies, securities companies and insurance companies are also offering the service.

7. Electronic signature

In light of the rapid spread of e-commerce, the e-Signature act was passed in 1999, with a view to establishing a secure Internet environment. The authorized e-Signature can be confirmed and verified through authorized authentication certificates. The certificates are issued and managed by authorized authentication agencies that are designated by the government. Beginning with the procurement service, the accredited certificates serve to verify both public and private transactions.

8. Online security trading

The rate of online trading for volume stock and options trading in 2003 was 51.1%, a decrease of 1.0% over the previous year. However, the amount of overall trading increased by 13.3%, as the percentage of retail investors —the main users of online trading— decreased only slightly and the numbers of foreign traders increased. As a result, although online stock trading decreased, online KOSPI 200 futures and options trading increased.

III. Development of SMEs within the IT revolution

A. Overview of the relative importance of SMEs in the overall economy

1. Status of SMEs in Korea

In Korea, SMEs are defined in terms of the number of employees in the firm. In manufacturing, companies with less than 300 employees are considered SMEs. There were approximately 3.2 million firms in the manufacturing sector in Korea in 2003, most of which were SMEs (table 29). In the same year, the manufacturing sector had 14.6 million employees, of which 88.2% were employed by SMEs (table 30).

TABLE 29
NUMBER OF FIRMS BY SIZE

	2001		2002		2003	
	Number (1,000)	Composition (%)	Number (1,000)	Composition (%)	Number (1,000)	Composition (%)
Total	3 046.5	100	3 132.0	100	3 187.1	100
1-4	2 576.7	84.6	2 635.4	84.1	2 681.5	84.1
5-99	456.5	15.0	485.3	15.5	494.3	15.5
100-299	8.9	0.3	8.8	0.3	8.9	0.3
More than 300	2.5	0.1	2.5	0.1	2.4	0.1

Source: National Statistical Office, 2004, Survey Report on Basic Workplace Statistics.

TABLE 30
NUMBER OF EMPLOYEES BY SIZE

	2001		2002		2003	
	Number (1,000)	Composition (%)	Number (1,000)	Composition (%)	Number (1,000)	Composition (%)
Total	14 109.0	100	14 608.3	100	14 630	100
1-4	4 643.1	32.9	4 806.4	32.9	4 839.0	33.1
5-99	6 300.3	44.7	6 599.3	45.2	6 658.9	45.5
100-299	1 428.3	10.1	1 417.8	9.7	1 411.1	9.7
More than 300	1 738.0	12.3	1 784.9	12.2	1 721.7	11.8

Source: National Statistical Office, 2004, Survey Report on Basic Workplace Statistics.

A detail of statistics by industrial sector is shown in table 31. SMEs dominate most industries, but this is less true in the agriculture, fisheries, electricity, financing and business service sectors.

TABLE 31
NUMBER AND EMPLOYMENT BY INDUSTRY (2002)

	Number of firms			Employment		
	Total (1,000 firms)	SME (1,000 firms)	Ratio of SME (%)	Total (1,000 persons)	SME (1,000 persons)	Ratio of SME (%)
Agriculture	0.5	0.5	98.2	4.7	3.8	80.6
Fisheries	0.1	0.1	98.5	4.6	3.5	77.1
Mining	1.9	1.9	99.8	17.5	15.2	86.5
Manufacturing	332.6	331.8	99.8	3 368.4	2 674.2	79.4
Electricity & water	0.3	0.3	98.3	7.3	6.0	82.6
Construction	78.3	78.0	99.9	689.7	629.6	91.3
Wholesale & retail	894.0	893.0	99.9	2 587.1	2 373.8	91.8
Hotels & restaurants	634.9	635.0	99.9	1 723.6	1 680.0	97.5
Transportation	306.0	306.0	100	798.1	727.1	91.1
Communications	4.6	5.0	99.2	57.0	39.7	69.7
Financing & insurance	10.5	10.0	95.6	160.4	56.2	35.1
Real estate & leasing	91.3	91.0	99.7	263.8	235.6	89.3
Business services	77.2	76.0	98.9	791.7	528.7	66.8
Education services	91.9	91.0	99.5	389.7	355.3	91.1
Health & social work	54.0	54.0	99.9	266.5	260.2	97.7
Recreation	115.0	115.0	99.8	289.4	258.9	89.5
Others	260.0	26.0	99.9	556.2	537.7	96.7
All	2 953.1	2 948.2	99.8	11 975.7	10 385.0	86.7

Source: National Statistical Office.

The gross output of SMEs reached 282 trillion won, or 49.1% of GDP, in 2002, while exports reached US\$ 68.3 billion, representing 42% of the nation's total exports (see table 32). Export volumes and percentage of total exports continued to increase.

TABLE 32
EXPORTS BY SMES
(In millions of U.S. dollars)

	2001			2002			2003		
	Amount	Change (%)	% of total	Amount	Change (%)	% of total	Amount	Change (%)	% of total
Total exports	150 439	-12.7	100	162 471	8.0	100	193 817	19.3	1100
SMEs (ventures)	64 600 (5 554)	1.7	42.9	68 308 (5 961)	5.7	42.0	81 699 (7 379)	19.6	42.2
Large enterprises	85 738	-21.1	57.0	94 053	9.7	57.9	112 015	19.1	57.7
Other	101	-20.5	0.1	110	8.9	0.1	103	-6.4	0.1

Source: Small and Medium Business Administration (SMBA).

2. Venture companies

Venture companies have been promoted by the government with special emphasis, since ventures were regarded as a strategic means of achieving both international competitiveness and job creation following the economic crisis of 1997. Three criteria define a venture, according to the government's requirements in providing incentives, as shown in table 33. Namely, the criteria are: companies that have a certain share of venture capital investment; a certain level of R&D investment; a new technology or patent. The total number of recognized ventures in 2003 was 7,702.

TABLE 33
NUMBER OF VENTURE COMPANIES BY TYPES

	2002		2003	
	Number of companies	Composition (%)	Number of companies	Composition (%)
Venture capital	1 124	12.8	718	9.3
R&D	1 325	15.1	1 483	19.3
New technology	6 329	72.1	5 501	71.4
Total	8 778	100	7 702	100

Source: Small and Medium Business Administration (SMBA).

Venture companies are concentrated in general manufacturing and in the information-related software sector. As shown in table 34, as of 2003, 68.0% of ventures were in manufacturing and 23.8% are in the information software sector.

TABLE 34
NUMBER OF VENTURE COMPANIES BY INDUSTRY

	2002		2003	
	Number of companies	Composition (%)	Number of companies	Composition (%)
Manufacturing	5 679	64.7	5 234	68.0
Info. processing SW	2 390	27.2	1 832	23.8
R&D services	286	3.3	278	3.6
Construction	172	2.0	117	1.5
Transportation	119	1.3	144	1.9
Wholesale & retail	21	0.2	25	0.3
Primary industry	111	1.3	72	0.9
Total	8 778	100	7 702	100

Source: Small and Medium Business Administration (SMBA).

3. Investment in informatisation

The larger the firm, the larger was the amount of investment, as indicated by table 35. As shown in table 36, investment aimed at reducing labour costs was the highest, with 29.7%. Investment in hardware (H/W) and software (S/W) represented 25.6% and 22.0%, respectively.

TABLE 35
STATUS OF INFORMATISATION INVESTMENT BY SIZE OF COMPANIES
(In millions of won)

	Average amount of informatisation investment		Growth rate (%)
	2002	2003	
Under 300	323	343	4.8
300-1,000	1 534	1 504	-2.0
More than 1000	13 114	15 120	15.3

Source: Small and Medium Business Administration (SMBA).

TABLE 36
STATUS OF INFORMATISATION INVESTMENT BY AREA
(In percentages)

	2002	2003	
	Composition (A)	Composition (B)	B-A
Hardware	29.0	25.6	-3.4
Software	21.1	22.0	0.9
Networks	14.3	15.2	0.9
Labour cost	29.4	29.7	0.3
Others	6.2	6.6	0.4

Source: Small and Medium Business Administration (SMBA).

4. The role of Korea's SMEs in the new era

Utilisation of IT is the key factor for economic performance in the knowledge-based economy. The development of IT affects the market, customers, the competitive structure, supply and procurement, i.e. all aspects of the industrial environment. Thus, informatisation of the industry, through combining IT with business activities, is emerging as a new engine for economic growth. In particular, combining IT with traditional industry is one of the urgent tasks of the Korean economy, so as to avoid industrial hollowing-out. Enterprises benefit from informatisation, in terms of productivity improvement, cost reduction, product innovation, and shortening of the manufacturing cycle.

SMEs do not have sufficient capabilities for digitisation, thus they usually depend on outsourcing. In the case of B-to-B and e-commerce, they are often influenced by the large firms with which they do business.

In a new era marked by free trade, international competition and global business relationships, transition to a knowledge-based economy, represented by IT, will be the key trend. The rapidly changing business environment forces enterprises to maintain a high level of flexibility and creativity, and small and medium enterprises (SMEs) are potential sources of innovation and creativity that will play a leading role in this new era. In order to become key players in the competitive market economy, SMEs should develop new technologies and innovate their procedures and management capacities.

For this to occur, a climate of fair competition and liberal business management needs to be created in order to promote self-reliance among SMEs and to encourage start-ups. Additionally, business-to-business cooperation based on mutual trust should also be promoted.

As the cornerstone of the national economy, SMEs have made an indispensable contribution to Korea's production, exports and growth. In addition, SMEs in Korea have improved the industrial structure, boosted employment, and helped to enhance the quality of people's lives.

B. Case study on usage of e-commerce and supply chain management (SCM) in selected industries

For the case study, three patterns are discussed in this section. The first (Pattern One) deals with the partnerships between large firms and SMEs. The industry chosen for Pattern One is the IT equipment industry, where partnerships between large firms and SMEs are common. LG Electronics, and DiCON Co., Ltd. were selected for the firm-level case study.

The second pattern (Pattern Two) is characterized by networking among SMEs aimed at promoting exports and e-commerce. Two industries were chosen for Pattern Two: the textile/garment industry and the footwear industry, where networking among SMEs through industrial associations is strong. For the textile/garment industry, i-Textil Ltd., an export-oriented clothing manufacturer, was chosen for the firm-level case study. For the footwear industry, Tae Kwang Inc., a footwear manufacturer, was selected.

The third pattern (Pattern Three) deals with services for supporting international trade. Silkroad21, an e-Trade infrastructure operated by the Korea Trade-Investment Promotion Agency, and Tpage Global Co., an export-solutions provider, were selected for this category.

1. Pattern one: Partnership between large firms and SMEs

a) IT equipment industry and the case of LG Electronics

Collaboration between large firms and SMEs for digitisation has been facilitated by special government policies. The most powerful of these are the collaborative informatisation project, the Small Business Networking Project and the Industry B-to-B Networking Support Project.

The collaborative informatisation project is intended to support SMEs and large firms through a supply network, and to support SMEs that plan to launch informatisation collaboratively through e-marketplaces. In 2001, 4,000 firms were supported. In 2002 and 2003, 14,000 firms and 12,000 firms, respectively, were supported. The project is part of the 300,000 SMEs informatisation Support Project.

The Small Business Networking Project is designed to facilitate the supply of e-Business service and IT education suitable for small business. During 2001 and 2002, a total of 240,000 small businesses benefited from this initiative.

The Industry B-to-B Networking Support Project was designed to establish model benchmarking B-to-B e-commerce projects among firms in selected industries, with plans to eventually extend this to all industries. From 2000 to 2003, a total of 40 industrial cooperatives were supported.

It has not yet been determined how many firms in the IT industry overall, or in the IT equipment industry, in particular, have benefited from these policies. However, due to their familiarity with IT, it is presumed that a relatively high number of firms in this sector have benefited.

As the age of global Supply Chain Management (SCM) emerges, large manufacturers in Korea, such as Samsung Electronics, LG Electronics, and POSCO, have been establishing SCM systems to share information on a 24-hour-a-day basis regarding production, sales, shipments, logistics, etc., with partners throughout the world. In line with this scheme, world-famous SCM firms, such as i2Technology and EXE Technology, as well as IT companies such as Oracle, IBM and SAP, are actively penetrating the Korean market to capture the emerging demand. LG Electronics offers an interesting case in this respect. The company is establishing a logistics information system for its 72 overseas subsidiaries, coordinated through three business headquarters: Digital Display & Media, Digital Appliance and Telecommunications.

In 2000, the company introduced Exceed, a logistics information system of EXE Technology, to the White Home Electronics Centre at Changwon Factory. The system has been expanding to cover overseas logistics centres in Mexico, Texas, New Jersey, Australia and Panama. The company is introducing a B-to-B integration system for coordination with its 1,800 SME partners in domestic and overseas markets. In this regard, LG Electronics has implemented the “M-to-M (Machine-to-machine) Integration Project,” which has networked the parent company and SME partners since 2002. The company successfully completed the first phase of the pilot system that integrates three partners in the Changwon area. The SME partners built Enterprise Resource Planning (ERP) and connected it to the parent company. Through this system, information can be obtained regarding orders, production plans and warehouse stocking of the parent company, while at the same time providing the ability to wire information on available production capacity, inventory and performance to the parent company.

The SME partners that participated in the project were able to reduce the manufacturing lead time and enhance the ability to respond to orders through the information sharing system.

They also reduced quality defects and errors by sharing product information, such as item names and standards and composition of parts.

LG Electronics expanded the project to 15 SME partners in 2003, with plans to expand to a total of 32 partners in 2004. It intends to complete the global production planning, procurement and implementation partnership environment with medium-sized enterprises, overseas subsidiaries and domestic subcontractors with access to the system. For this plan, the company will continue to obtain and implement new solutions, in order to optimise the operation of its supply network and SCM.

Samsung Electronics also is improving the existing Glonet system, which is an SCM process with some 3,000 online purchasing partners throughout the world, through a consortium that includes Samsung SDS, IBM-Korea and i2Technology-Korea.

b) DiCON Co., Ltd.

Since its establishment in 1990 as a computer systems design and development company, DiCON Co., Ltd has grown rapidly and has now become a frontrunner in its field. DiCON has developed various technology-intensive, special-purpose computer systems. Among them is a touch screen LCD monitor, the first of its kind, both in the domestic market and abroad, that employs the company's patented infrared touch screen technology and super twisted nematic (STN) LCD panel, which appeared in 1994. This product became the foundation for the company's current thin film transistor (TFT) LCD monitor technology. Based on this technology, the company has continued to develop technological skills and new products, and has now become recognized for leading-edge technology skills and high-quality products.

The company's capitalisation is 2.2 billion won and as of February in 2002, it employed 72 employees. Its main products are business and industrial TFT LCD monitors, LCD TVs, LCD displays and LCD TV Controllers and Touch Screens.

The company has been seeking to be a leading-edge company in the field of digital display systems, including various types of LCD monitors, multifunctional multimedia monitors, web-based terminals, as well as digital LCD TVs for home use and various kinds of industrial digital display systems.

DiCON Co., Ltd is an LCD monitor manufacturer with over 100 customer sites. Sales volume was US\$ 9 million in 2003 and is expected to reach US\$ 30 million in 2004. The company began its LCD business with the development of LCD touch monitors in 1994. In 1997, the company developed 10.4-inch and 12-inch video graphics array (VGA)-class LCD monitors.

In 1998 the company developed 15-inch extended graphics array (XGA)-class LCD monitors. This historic development indicates that the company made substantial ongoing efforts in product development and market expansion. In 1999 the company developed 17- and 18-inch XGA-class LCD monitors and received the 'One million Export Award' from the government. LCD production is dominated by Japan, Korea and Taiwan Province of China. DiCON Co., Ltd has a technological advantage in that it is the only company capable of producing monitor products with its own technology, as Samsung Electronics and LG Electronics do with their products.

The company exports to 30 global companies, including ones in Japan, China, Hong Kong (China) and Italy. It has approximately 50 domestic customers, including Samsung Electronics, Samsung SDS, Hyundai General Trading Company, Daewoo Telecommunications, Sejin Computer, Orion and Hansol.

2. Pattern two: Cooperation and networking among SMEs

a) Textile/garment industry and the case of I-Textil

The Korea Federation of Textile Industries (KOFOTI) is playing a leading role in supporting Korean textile-related companies and acting as a bridge between local textile-related companies and foreign buyers.

In line with basic approaches involving rapid response to changes in the textile environment, competitive reinforcement of local Korean companies, strategic cooperation between enterprises and government, and concentrated support for export, management, technology and information, KOFOTI maintains an aggressive global marketing style, supports futuristic strategic industries, reinforces textile information networking, and supports international commercial relationships.

As an aggressive global marketing strategy, KOFOTI supports local companies' export and marketing activities. KOFOTI offers a wide range of financial assistance, such as loans and guarantees, as well as statistical surveys providing updated information on market trends, thus boosting domestic textile companies' efforts to move into new technologies and materials.

In addition, KOFOTI provides various types of supports and promotions that include trade information, dispatch of overseas market optimisation teams, assistance for participation in international exhibitions, support for promising start-ups, and linking of overseas and domestic companies, along with support for PR activities.

KOFOTI operates a fashion information library to deliver the latest textile and fashion information, in addition to providing scholarships to university students. The federation also runs a textile and fashion personnel information centre to deal with the shortage of workers and to reduce recruitment costs.

The company i-Textil Ltd. was founded in 1972, under the name Searim Co., Ltd., which was changed to i-Textil Ltd. in 2000. The company's primary business is clothing manufacturing, with an emphasis on exports. The company is an international processing trade enterprise for clothing manufacture, and is primarily focussed on exports, with a 93% export rate. The company accepts orders domestically and produces the finished goods abroad. The government recognized the company through its "Award for the Best Vendor" and "Honour of Industrial Service Merit-Tin Tower." The company registered on the Korea Securities Dealers Automated Quotations (KOSDAQ) in 2000.

The original materials are supplied and exported by purchasing the original production machinery and subordinate resource material from domestic and foreign corporations, such as the Chonbang Textile Industry, Ilshin Spinning Co., Ltd., Daehan Spinning Co., Ltd., Magnolia, Maral, and Kaha. Domestically, the textile products (clothing fabrics for sewing machinery) are produced through domestic outsourcing and consignment of processing management, for each type of process, such as textile dyeing and processing, while the products, which are completed at foreign factories, are shipped and exported directly.

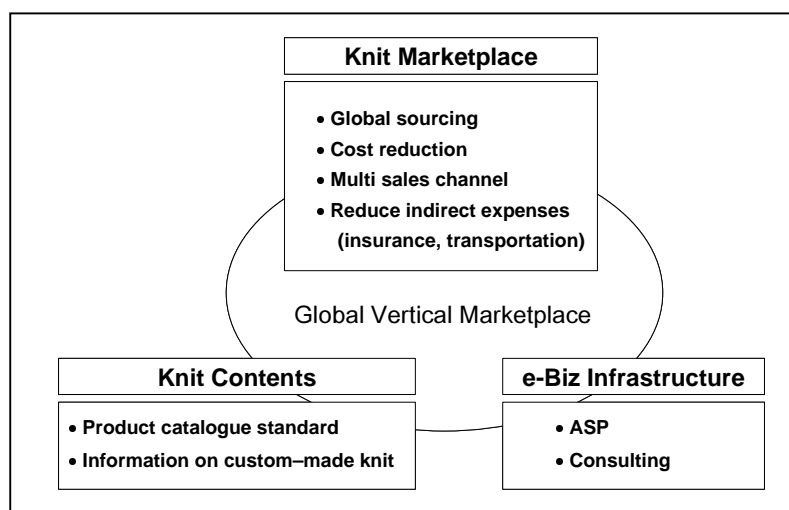
The company is constructing a Global ERP system in collaboration with a foreign, on-site corporation, providing a modern management system, as well as advancements in B-to-B e-commerce for knit products.

The company invested in BtexB Ltd. BtexB Ltd. is the first e-commerce VOTAL (Vertical Portal) specialized in trading knit textiles among companies. BtexB was created in the form of a consortium of off-line knit textile companies and online e-commerce solution companies, in order to enhance the competitiveness and efficiency of the knit industry.

Global market size of the knit industry is estimated at some 300 trillion won. However, with rapid changes in the international trade and distribution environment, customers consistently demand higher quality, faster delivery and lower prices. To address these changes, it is essential to utilize Internet technology, through the use of computers, information resources and communication technologies. Rapid advances in Internet technology have brought about fundamental changes in international trade and distribution systems and compelled the knit industry to shorten its decision-making process and increase flexibility, in order to respond to the new environment.

BtexB Co., Ltd. is a venue in which all members of the knit industry can exchange information and knowledge and share their methods for purchasing and for handling raw materials and shipping facilities. As a result, the knit industry is able to reduce costs and expand the market, thus avoiding wasteful competition while securing constructive competitiveness. BtexB Co., Ltd. is a professional B-to-B e-commerce company aimed at fostering the development of the knit industry.

FIGURE 1
CONCEPT OF BTEXB

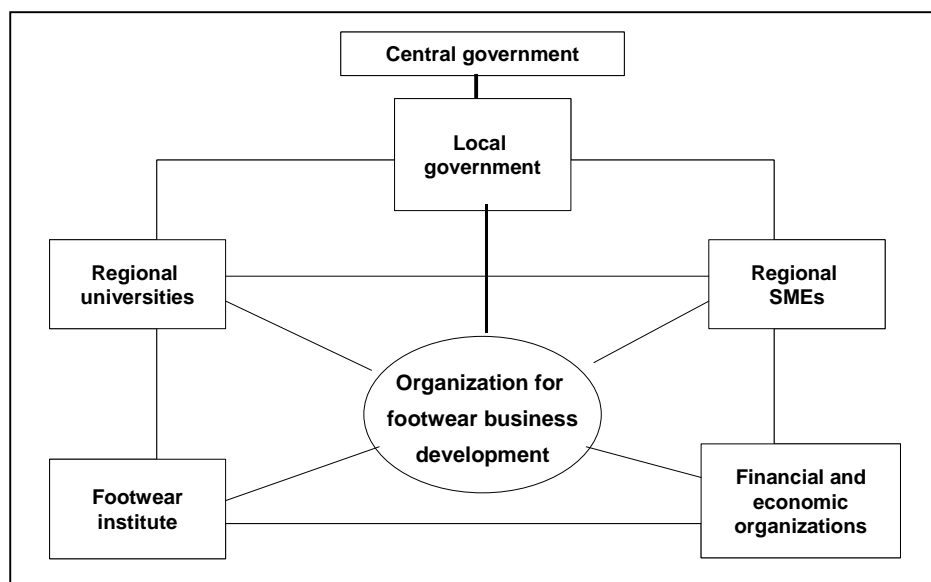


Source: Prepared by the author.

b) Footwear industry and the case of Tae Kwang Ind. Co.

Tae Kwang Ind. Co., Ltd. is a shoe manufacturing company located at Andong Industrial Complex in Gimhae city. Tae Kwang Ind. specializes in OEM systems, manufacturing 15 million pairs of shoes annually, with the entirety of production for export consisting of sports shoes for NIKE. The headquarter in Gimhae is the venue for research and development (R&D) activities as well as for sample production, while mass-production is carried out at a total of 24 production lines operated in China and Viet Nam. Last year, the company reached over 400 billion won in sales supplying shoes on an original equipped manufacturer (OEM) basis.

FIGURE 2
FOOTWEAR INDUSTRY NETWORK



Source: Prepared by the author.

In corporate rankings, the company is ranked third after Pouchen and Pentai of Taiwan Province of China, among a total of more than 50 worldwide companies engaged in OEM business for NIKE. Tae Kwang Ind. was also the first to launch the “NOS” work process innovation project in 2000, a program designed by NIKE. “NOS” is an abbreviation for the Latin “Novus Ordo Seclorum,” meaning the start of a new order.

The development centre is divided into a project team, a mold team and a development team, all of which are integrated via an online cooperation system. The project team performs the role of managing the product development process, including receiving new design sketch data from NIKE, created using three-dimensional computer augmented design (CAD), confirming orders and requesting material purchases, etc. Once the project team delivers the design data from NIKE to the mold and development teams, the mold team designs the shoe’s sole, while the development team designs the shoe’s uppers using PCs. During this process, both teams create primary samples. Complete data are frequently being checked by NIKE Korea, stationed in Busan, through the online cooperation system. This process is applied in identical fashion to all 5 stages in the sample manufacturing process, until the sample data are transmitted to overseas production factories.

In the past, orders were received via fax, material purchase requests were individually prepared in writing for authorisation, and samples from each stage were hand-delivered to NIKE Korea for approval. However, the establishment of the online cooperation system has drastically reduced the time and cost involved in the process.

Tae Kwang Ind. discarded the traditional method of shoe manufacturing in 2000 and established “TRUST,” a computer-based composite manufacturing system to manage entire processes from order reception to product forwarding, via collaboration between the headquarter in Korea and local overseas factories. TRUST encompasses entire systems, including enterprise resource planning (ERP), product data management (PDM) and knowledge management system (KMS).

TRUST was launched in 2001 by creating a connection between the Korea headquarter and the factory in Viet Nam. It was also implemented in the factory in China. Thus, the online production system linking the headquarters in Korea with two overseas factories was completed. Once parts information required in product development is automatically created in PDM via connection with EPR and PDM, the information is then delivered to ERP to carry out material purchasing.

Next, Tae Kwang Ind. introduced the “Project Link” in 2002 to aid headquarters in efficiently managing product development projects carried out at the development centre. The product lifecycle management (PLM) solution development company, PTC Korea, has supplied the PLM solution, “Win7 Project Link 6.2” to Tae Kwang Ind. and has completed implementation of the cooperation system. Tae Kwang Ind. began setting up the cooperation system in December 2002. The goal was to provide a link in the supply chain management (SCM) system, connecting the current client company (NIKE), through the online cooperation system, with overseas production factories in China and Viet Nam, while at the same time reducing time and costs associated with product development, etc. Currently relying on Korean staff totalling more than 340 employees, Tae Kwang Ind. has been using this system as of July 1, 2003. In the near future, use of the system will be extended to local workers in overseas factories.

The company is planning to establish a system to enable real-time cooperation in the future, not only for the affiliated companies in Korea, but also for those connected to the two overseas factories. Through the establishment of such a digital manufacturing system, the volume of inventory has been cut more than twofold. Moreover, although NIKE is allowing 9 months from the stage that involves passing on new product designs to the OEM company, to delivery of goods, Tae Kwang Ind. is able to begin making deliveries in a mere 4 months. This has been the result of dramatic improvement in the work process through combining the latest IT technology with traditional manufacturing business methods.

The company has founded an IT company called “Shoetech” to promote sales and export of its digital shoe manufacturing and cooperation system, with the goal of providing know-how to shoe manufacturing companies in Korea and overseas that deliver goods to NIKE on an OEM basis. The competitive power of the shoe manufacturing business depended, in the past, on reducing labour costs and maximizing the number of pairs of shoes produced in a day. Now, however, it depends on who is able to produce shoes that satisfy customers’ tastes and get them to market faster than the competitors. In order to reduce the time to market, digital manufacturing infrastructure, related to ERP and PDM, must be instituted.

3. Pattern three: Support services: cases of Tpage and handysoft

a) Support services and Silkroad21

Silkroad21 was devised by the Ministry of Commerce, Industry, and Energy (MOCIE) as part of a five-year plan to stimulate e-Trade and e-commerce from 2000 to 2004. The project was managed by the Korea Trade-Investment Promotion Agency (KOTRA) and sponsored by the Small & Medium Industry Promotion Corporation (SMIPC), the Korea International Trade Association (KITA), the Korea Trade Network (KTNET) and other organisations.

The objective of Silkroad21 was to establish a national infrastructure for electronic commerce enabling access to all trade-related information currently dispersed among the different organisations mentioned above, as well as among regional governments, general trading companies and private firms.

The power of Silkroad21 is its ability to integrate all Korean trade-related information from numerous major buyers and sellers. These can now perform a one-stop search to access all selling and buying offers posted on the Korean market, as well as other trade-related information, such as a comprehensive list of companies, products, etc.

With the launch of Silkroad21's website (www.silkroad21.com) in December 2002, Korean importers and exporters were able to easily conduct transactions using this B2B portal. Foreign visitors to the site could also access global trade information, since Silkroad21 serves as a gateway to other Korean electronic trade sites.

With strategic alliances, and affiliations with influential trade organisations and sites around the world, Silkroad21 established itself as a market leader and as one of the most comprehensive trade infrastructures available.

With a powerful search function, Silkroad21 provided access to integrated information, in partnership with trade-related organisations and other leading agencies.

With a single click, one can access global trade information and be automatically registered in the affiliated Silkroad21 sites. Silkroad21 seamlessly integrated both online and offline markets by sharing offers to buy and sell with other influential trade sites at no cost.

Silkroad selected and reorganized information based on the needs of users, so that they could utilize the site more conveniently and effectively.

Buyers and sellers can log on to www.silkroad21.com to buy and sell goods in the following categories: Agricultural and Food; Automotive and Vehicles; Beauty and Household; Chemical and Plastics; Computers and Telecommunications; Electrical and Electronics; Environment; Glass and Optical; Machinery and Equipment; Medical and Health; Minerals; Sports and Leisure; Stationery and Gifts; Textiles and Leather; Wood and Furniture, and others. Visitors to the site may also access a currency converter, transportation schedules, country reports, a Korean exhibition calendar and more.

On February 1, 2005, KOTRA integrated two previous e-Trade sites, Silkroad21 (www.silkroad21.com) and Kobo (www.kobo.net), which it had managed, and created Buykorea (www.buykorea.org), an upgraded B-to-B e-marketplace for SMEs. The e-Trade portal is part of the "e-Trade Korea" project, a national initiative to place Korea at the centre of a global e-Trade hub.

For more convenient use, the portal improved features that included a powerful search engine, an electronic catalogue containing production information and three-dimensional product images, and foreign market and trade-related information provided by KOTRA's 105 overseas offices.

KOTRA also added a cyber marketing menu to Buykorea.org, by which companies could upload corporate and product information to promote their services and products, whereas existing e-Trade or e-Business websites only allow people to view trade-related information.

Notably, the new e-Trade portal not only enables foreign companies to search for Korean buyers and suppliers, as well as product information, but also provides the capability to hold real-time video trade consultations via the Internet.

The new website has eliminated all temporal and spatial restraints and eased the cost burdens that Korean SMEs incurred in having to pay for expensive airfare when extending invitations to foreign buyers. Both one-on-one and multiparty video consultations are possible using the new website. Users are also able to store video conferencing records for future reference. Buykorea.org will serve as a cornerstone for Korea's development into the world's eighth largest trading power by 2008, achieving US\$ 400 billion in exports. KOTRA aims to transform Buykorea.org into a total one-stop service e-Trade portal by adding online financing services that will enable member firms to sign export contacts and settle payments online.

b) Tpage Global Co., Ltd.

Tpage Global was established in 1996 as an e-commerce skills development company for Korean firms, and expanded its operation in 1999 by introducing Tpage.com, which offers international business-to-business trading sites. Tpage.com provides a full-solution package for global traders to execute an entire transaction via the website, procure the necessary financing and arrange shipments. Tpage successfully exhibited in the 1998 Internet Trade Expo, and in 1999 was cited by the government as an outstanding venture company. Tpage.com employs a total of 50 people.

The “Tsearch” search engine is an initiative of Tpage, specializing in subjects relating to international trade. The site has proven to be highly popular with traders worldwide, who frequently use the site’s “Auto Multi Posting” system to post offers to buy or sell. Tsearch provides traders with a simple, hassle-free posting procedure. Completed offers are automatically transferred and posted to all other trading websites. In addition, Tsearch’s “Offer Meta Search” provides a vast amount of information on suppliers or buyers, listed internationally and immediately available to traders through a simultaneous search of all other trading websites, thus generating a huge volume of trade leads.

One of Tpage’s services is its “Internet Business Consulting,” which provides businesses with a total solution for their web trading needs. Other services include: Home-page development; E-commerce tool development; Internet trade marketing service; Web promotion service, and Directory information, for companies seeking to market via the Internet. Tpage represents companies wishing to market their products internationally, providing information on possible partners, the competition and their products. As the B-to-B Internet market grows, Tpage stands ready to provide vital services that will enable participant companies to grow along with this vital new trading medium.

Tpage’s target market is international traders and, through Tpage.com, its ultimate aim is to make B-to-B dealings simpler and more efficient. Tpage’s global plan is two-fold. First, its approach is to provide a full range of solutions that will allow a user to find trade leads, qualify them, secure payment and handle all factoring and shipping through the proprietary and streamlined back-end process. Second, the company is using the Tpage business model to form joint ventures worldwide with established, powerful, local conglomerates.

Tpage’s gross sales at the end of the third quarter of 2000 amounted to US\$ 5 million, of which the major share was from the company’s cyber trading solution business. Year 2000 January-to-September overseas sales stood at US\$ 700,000, and a further US\$ 1.5 million was expected to be generated by the end of this year. In addition to the cash flow represented by these figures, the volume of contracts exceeded \$5 million by year’s end.

Tpage exports solutions widely, but primarily to clients in the United States, Europe and Asia. To match increasing demand, the Tpage trade team is recruiting more international trade expertise.

The company’s line of business is a B-to-B portal site, equipped with an expert trade search engine, which can search information on firms worldwide in the shortest possible time using a classification system. The company provides a Meta Buyer search function that searches buyers throughout the world, along with an Auto Multi Posting function that can register one-shot inputs in the world’s major trade sites. In addition to these, Tpage.com has several functions such as business directory searching, cyber booth, electronic catalogue automatic generator, Expo Exhibition Place, My Tpage (Individual Integrated Trade Management), business community, etc.

Tpage.com offers information in various languages, including English, Korean, Chinese, Spanish, Japanese, French, Portuguese and German.

C. Problems SMEs face in participating in the trade-oriented value chain

Since the Korean economy has developed with a dual structure, with a small number of powerful large companies coexisting with numerous weaker SMEs, the latter do not have sufficient manpower or organisational capability to participate in the informatisation process. SMEs lack experience in e-commerce. Moreover, Inter-firm e-commerce is limited, due to non-technology factors such as low transparency and lack of infrastructure. In addition, there is currently an insufficient level of standardisation.

Challenges facing SMEs are summarized as follows:

1. Chronic labour shortage

SMEs have long suffered from labour shortages, in terms of both the quantity and quality of applicants. A survey, for instance, reports that the smaller a company's size, the fewer workers with college degrees it has. Moreover, employees of such companies frequently change jobs, making it difficult for the firms to accumulate technologies.

The labour shortage problem is partly attributable to the poorer working conditions of SMEs. In general, smaller businesses can only afford to pay two-thirds of the wages and fringe benefits paid by large companies, while industrial accidents take place more than twice as often as in large companies (see table 37).

TABLE 37
COMPARISON OF WORKING CONDITIONS

	Wage <i>(millions of won/month)</i>	Working Hours <i>(per month)</i>	Extra welfare benefits <i>(thousands of won/month)</i>
Large companies	2.36	196.8	219 000
SMEs	1.77	200.4	140 000

Source: Small and Medium Business Administration (SMBA).

2. Less-competitive technology

SMEs generally lack technological competitiveness. According to the Federation of Korean Industries (FKI), competitiveness of the nation's SMEs stands at just 80% of their Japanese competitors. This makes it difficult for SMEs attempting to enhance competitiveness and upgrade their business structures.

In addition, SMEs are not making sufficient investment in R&D, forcing large companies to depend heavily on other countries for essential parts, material and key technologies. In particular, digital home electronics companies and cell-phone manufacturers import up to 70% of the parts needed for their products. Such strong dependency results in more than US\$ 10 billion in trade deficits every year in the parts and material sector alone.

Although there is a high level of adoption and installation of IT facilities, the utilisation of this infrastructure is low, due to insufficient manpower and mindset.

3. Insufficient cooperation between SMEs and large companies

In many cases, the relationship between domestic SMEs and large companies is lopsided, since the former act merely as subcontractors supplying parts to the latter. Moreover, SMEs are under continued pressure from large companies to cut unit costs. Although, in new industries such as IT and biotechnology, cooperation between the two sides has increased in recent times, this is not the case throughout the universe of companies.

What makes cooperation between SMEs and large companies more difficult is the nationwide absence of even a single cluster in which large companies, SMEs, universities and research institutes interact jointly in synergetic ways. Thus, companies, especially SMEs, lack opportunities to develop intellectual property.

4. Lack of international mindset and management skills to cope with overseas investment

A number of factors, including the labour shortages cited above, are pushing SMEs to move their operations out of the country. Overseas investments by these companies have increased sharply since the mid-1990s, amounting to a record US\$ 2.9 billion in 2000. In the first half of 2002, SMEs' overseas investments (US\$ 840 million) surpassed even those of large companies (US\$ 780 million).

The reason for this is that most SMEs lack the global mindset and management skills to cope with transplanting their operations. For example, the Global Management Index (tallied by the Korean Academy of International Business) for Humax, a representative in the venture industry, recorded 58.0 in 2002, far lower than the figure for Samsung Electronics (74.2).

According to a survey by KOTRA in 2003, approximately one third (32.0%) of firms responding were utilizing e-Trade. More firms in the heavy and chemical industries were utilizing e-Trade (34.3%), whereas only 21.6% of firms in the primary sector were utilizing e-Trade. In terms of size, 31.1% of SMEs were using e-Trade, whereas 40.5% of large firms were using e-Trade (see table 38).

TABLE 38
STATUS OF E-TRADE USE
(In percentages)

	Total	Industry			Size	
		Primary industry	Light industry	Heavy & chemical industries	Large firms	SMEs
Number of respondents	1000	57	284	659	96	904
Composition (%)	100	100	100	100	100	100
▪ Under 19	53.1	71.9	58.5	49.2	37.5	54.8
▪ 20 - 39	14.4	10.5	15.1	14.4	15.6	14.3
▪ 40 - 59	12.7	7.0	10.9	14.0	16.7	12.3
▪ 60 - 79	9.0	8.8	5.3	10.6	15.6	8.3
▪ Over 80	10.8	1.8	10.2	11.8	14.6	10.4
▪ Average	32.0	21.6	28.7	34.3	40.5	31.1

Source: Korea Trade-Investment Promotion Agency (KOTRA), 2003, Survey on Status of Export Industries 2003.

The main reason cited for not using e-trade was “no particular need”, accounting for 44.2% of all respondents. Insufficient IT infrastructure was given as the next-most common reason, with 23.5%, and the shortage of experts was cited in 19.1% of responses. SMEs and large firms indicated similar reasons. However, SMEs pointed to the shortage of experts as the reason more often than did larger firms, whereas a greater number of larger firms than SMEs pointed to insufficient infrastructure as the reason (see table 39).

TABLE 39
REASON FOR UNDER-UTILISATION OF E-TRADE
(In percentages)

	Total	Industry			Size	
		Primary industry	Light industry	Heavy & chemical industries	Large firms	SMEs
Number of respondents	1000	57	284	659	96	904
Composition (%)	100	100	100	100	100	100
Shortage of experts	19.1	12.3	22.2	18.4	14.6	19.6
Insufficient infrastructure	23.5	14.0	21.8	25.0	32.3	22.6
High cost burden	9.3	7.0	11.3	8.6	4.2	9.8
No particular need	44.2	59.6	43.0	43.4	43.8	44.2
Other	2.3	3.5	1.4	2.6	3.1	2.2
No Response	1.6	3.5	0.4	2.0	2.1	1.5

Source: Korea Trade-Investment Promotion Agency (KOTRA), 2003, Survey on Status of Export Industries 2003.

According to the survey, e-Trade was most effective for foreign marketing (30.0%). SMEs and large firms showed similar evaluations, with 30.2% and 28.1%, respectively. Heavy and chemical industries indicated this in the highest percentage (31.9%) (see table 40).

TABLE 40
EFFECTS OF E-TRADE ON EXPORT ACTIVITIES
(In percentages)

	Total	Industry			By Size	
		Primary industry	Light industry	Heavy & chemical industries	Large firms	SMEs
Number of respondents	1000	57	284	659	96	904
Composition (%)	100	100	100	100	100	100
Foreign marketing & publicity for own products	30.0	24.6	26.8	31.9	28.1	30.2
Finding foreign traders	19.8	21.1	19.7	19.7	11.5	20.7
Cyber export consultation/negotiation	9.1	10.5	8.5	9.3	7.3	9.3
Confirmation of conditions (export and Import approval, etc)	12.8	8.8	15.1	12.1	15.6	12.5
Banking transactions (opening L/C, etc.)	14.2	10.5	16.2	13.7	25.0	13.1
Distribution-related works (S/R, etc)	3.7	5.3	3.2	3.8	7.3	3.3
No response	10.4	19.3	10.6	9.6	5.2	11.0

Source: Korea Trade-Investment Promotion Agency (KOTRA), 2003, Survey on Status of Export Industries 2003.

Finding trade partners (29.3%), simplification of trade procedures (22.9%) and trade information (19.5%) were important advantages of e-Trade. To SMEs, finding trade partners was more important than for larger firms, whereas the other two advantages were relatively more important to larger firms than to SMEs (see table 41). There was not much difference between industries in regard to finding trade partners (see table 41).

TABLE 41
ADVANTAGES OF E-TRADE
(In percentages)

	Total	Industry			By Size	
		Primary industry	Light industry	Heavy & chemical industries	Large firms	SMEs
Number of respondents	1000	57	284	659	96	904
Composition (%)	100	100	100	100	100	100
Finding trade partners	29.3	29.8	29.2	29.3	20.8	30.2
Reducing marketing expenditure	16.8	12.3	13.7	18.5	14.6	17.0
Easy access to trade information	19.5	26.3	18.0	19.6	27.1	18.7
Simplification of trade	22.9	17.5	26.4	21.9	31.3	22.0
Reduction of trade-related business costs	3.9	1.8	4.2	3.9	4.2	3.9
No response	7.6	12.3	8.5	6.8	2.1	8.2

Source: Korea Trade-Investment Promotion Agency (KOTRA), 2003, Survey on Status of Export Industries 2003.

The most urgent task cited for promoting e-Trade was establishing a one-stop e-Trade service system (41.3%). Larger firms cited this more often than did SMEs (see table 42).

TABLE 42
ISSUES FOR PROMOTING E-TRADE
(In percentages)

	Total	Industry			Size	
		Primary industry	Light industry	Heavy & chemical industries	Large firms	SMEs
Number of respondents	1000	57	284	659	96	904
Composition (%)	100	100	100	100	100	100
Establishing one-stop e-trade service system	41.3	40.4	38.0	42.8	52.1	40.2
Providing e-trade-related laws, regulations and institutions	10.7	8.8	12.3	10.2	10.4	10.7
Supporting incentives fore-trade usage	10.9	5.3	11.3	11.2	8.3	11.2
Emphasizing supporting works such as trade management system distribution, etc.	23.3	21.1	22.5	23.8	17.7	23.9
Improving CEO cognition	5.8	8.8	8.5	4.4	8.3	5.5
No response	8.0	15.8	7.4	7.6	3.1	8.5

Source: Korea Trade-Investment Promotion Agency (KOTRA), 2003, Survey on Status of Export Industries 2003.

SMEs experience numerous constraints in efforts to participate in e-Trade (see table 43). Some of these are as follows:

- Since SMEs do not have sufficient internal digital manpower capability, they must rely on outsourcing when making investments in information systems.
- SMEs tend to passively implement B-to-B or e-commerce, following the example of large customer companies. This may limit the firm's business opportunities with other large firms.
- Many SME managers or chief executive officers (CEOs) do not understand digital-based management and technologies.
- Korean SMEs lack experience in electronic transactions and international trade.

TABLE 43
BOTTLENECKS IN E-COMMERCE OF SMES
(In percentages)

	Weak infrastructure	Distribution system	Payment means	Laws and institutions	Others	Total
Ratio	30.4	20.1	18.7	10.1	20.8	100

Source: Small and Medium Business Administration (SMBA), 2002, SMEs Policy in Korea 2002.

IV. Government policies designed for SMEs, IT, and international trade

A. IT policies in the country's overall development strategy

Korea's current IT policy is designed to strengthen the overall competitiveness of industries through informatisation, advance B-to-B e-commerce and create a safe and reliable online business environment.

The Korean government: enacted the Framework Act on Informatisation Promotion in August 1995; established the first Master Plan for Informatisation Promotion in June 1996; and established a national organisation for planning and implementation of the goals outlined in the Master Plan. The plan presented 10 key projects for the realisation of an advanced information society by the year 2010.

In March 1999, the government established Cyber Korea 21 as the blueprint for the new information society of the 21st century, in an attempt to overcome the 1997 financial crisis and transform the Korean economy into a knowledge-based economy.

In 2001, the Korean government established e-Korea Vision 2006 as the blueprint for the direction Korea would pursue over the next five years, to become a global IT leader in the 21st century. The Vision's objectives are:

To maximize the ability of all citizens to utilize information and communication technologies in order to actively participate in the information society, to strengthen global competitiveness of the economy by promoting informatisation in all industries, to realize a smart government structure with high transparency and productivity through informatisation efforts, to facilitate continued economic growth by promoting the IT industry and advancing the information infrastructure, and to become a leader in the global information society by taking a major role in international cooperation.

The promotion of informatisation was intended to focus on qualitative accomplishments, such as increased productivity, through legal and institutional reforms and innovations in business processes throughout society, rather than quantitative expansion of the Internet. Thus, the government focussed on upgrading the information infrastructure, supporting venture start-ups,

R&D and human resource development, as well as legal and institutional reforms to provide a foundation on which new industries can be created.

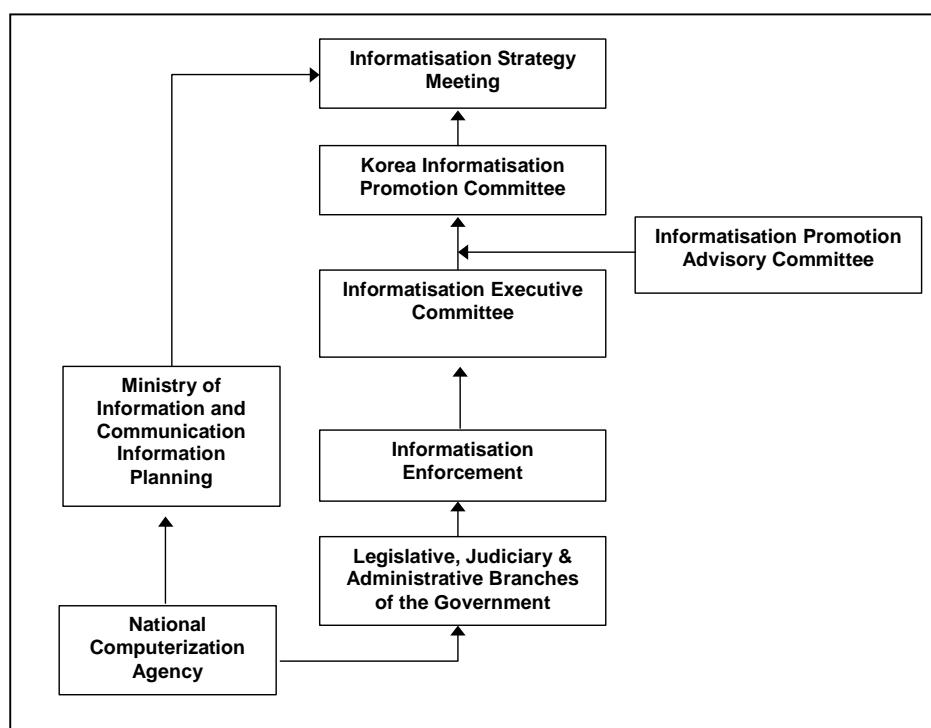
In addition, the government planned to create an environment in which the creativity of every citizen can be fully utilized to produce the best goods and services in the world. Investments in core technologies and strategic services were to be increased substantially.

The plan was designed to strengthen the competitiveness of all industries, through the informatisation process. To this end, the government focussed on enhancing the level of competitiveness and the value added of informatisation to all industries, including the textile, electronics, construction, financial, health care, and distribution industries. Moreover, small businesses were to be encouraged to actively participate in the digital economy.

Companies were to be encouraged to adopt information and communication technologies throughout the value chain, with the primary aim of enhancing the efficiency of business activities. In addition, the government would provide support for B-to-B e-commerce in each industry, in order to improve productivity and increase the transparency of transactions. To stimulate activity in B-to-B e-commerce, the government recognized the need to improve logistics and online payment systems. Furthermore, to enhance the efficiency of international trade, the government planned to develop a paperless e-Trade system.

With the development of the authentication system for e-commerce and the availability of high-quality information online, the government planned to provide the necessary aid to construct reliable cyber markets, ensuring that e-consumers would be protected, by strengthening consumer education initiatives and systematizing dispute resolution procedures.

FIGURE 3
NATIONAL-LEVEL STRUCTURE FOR INFORMATISATION IN KOREA



Source: Prepared by the author.

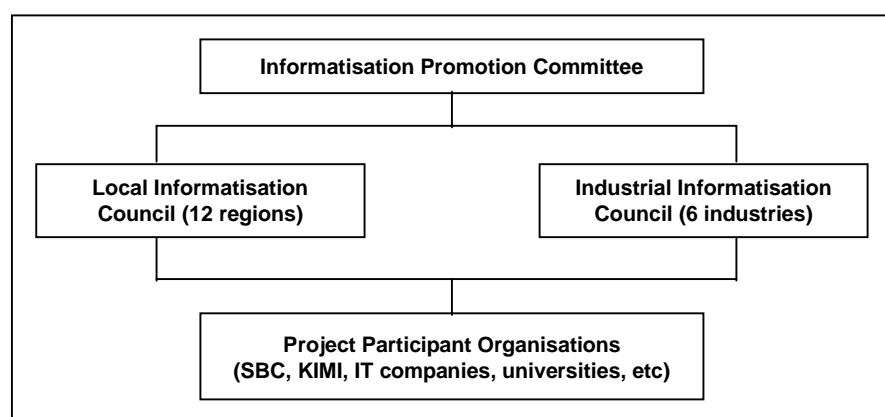
Pursuant to the Framework Act on Informatisation Promotion, the Informatisation Promotion Committee was established to coordinate the informatisation promotion plans of several ministries and prepare long-term informatisation promotion plans. Figure 3 shows the government structure for informatisation promotion. The Informatisation Strategy Meeting is the highest decision-making organisation within government for the national informatisation policy.

The Informatisation Promotion Committee oversees and coordinates an entire range of informatisation implementation policies. The Informatisation Executive Committee, as an executing subcommittee of the Informatisation Promotion Committee, is composed of the Chief Assistant to the Prime Minister, serving as Chairman, and 24 deputy ministers from various ministries. The committee makes decisions on implementation issues assigned by the Informatisation Promotion Committee.

The Ministry of Information and Communication (MIC) is in charge of planning and implementing national informatisation policies. The National Computerisation Agency oversees the national information and communication network.

Policy on informatisation of businesses is implemented in accordance with the Industry Informatisation Promotion Plan. The Ministry of Commerce, Industry and Energy (MOCIE) plays the central role in the Industry Informatisation Promotion Plan, in cooperation with MOIC and the Small and Medium Business Administration (SMBA). MOCIE's Industry Informatisation Subcommittee coordinates policies in e-commerce, informatisation (through sectoral plans), international trade and national resource management, and attempts to maximize the synergetic effects of the policies. Numerous entities, such as government organisations, trade groups, individual business entities, universities and research centres, are involved in projects for the informatisation of industries. Among these organisations, the SMBA plays a key role in the informatisation of Korea's SMEs. SME informatisation policy is coordinated by SMBA, which oversees the SME Informatisation Promotion Committee (figure 4). This committee prepares comprehensive plans to support informatisation of SMEs, coordinates the participating organisations and evaluates their performance.

FIGURE 4
SME INFORMATISATION PROMOTION SYSTEM



Source: Prepared by the author.

There are Informatisation Councils for each of the six key areas (in table 45). These identify and resolve difficulties that SMEs view as obstacles to informatisation, constructing strategies to promote e-commerce in each area.

Twelve local SME Informatisation Councils, governed by the local SMBAs, prepare concrete strategies for SME informatisation and carry out projects in their local areas, in consultation with related local organisations.

MOCIE is undertaking three major projects for the national informatisation strategy: promoting e-commerce among industries; building e-commerce infrastructure; and globalising e-commerce. The National Computerisation Agency and the Korea Association of Information and Telecommunication are sub-divisions within the MIC.

The SMBA coordinates and implements SME informatisation plans for organisations such as the Korea Informatisation Management Institute for Small and Medium Enterprises. The Small Business Corporation (SBC) and the Korea Information Management Institute for Small and Medium Enterprises (KIMI) are sub-divisions within the SMBA. The SBC supports projects related to the development of SMEs, including SME digitisation, providing consulting services on informatisation management, training of informatisation professionals, support for e-commerce and for operating informatisation machinery and tools, and exhibition and training centres.

The Korea Information Management Institute for Small and Medium Enterprises (KIMI) supports SME management innovation and productivity improvement. Its activities include: digitising production information of SMEs; building IT infrastructure in SME-concentrated areas; constructing IT networks for industry associations; building informatisation management systems; providing IT education to employees in SMEs; and developing e-business models for small enterprises.

B. Policies in support of SMEs

1. Projects of the Ministry of Commerce, Industry and Energy

An outline of the Small and Medium Business Administration's 2002 policy on SMEs includes:

- Strengthening SMEs' potential for technological innovation: Provision of assistance to 2,000 "Inno-Biz (businesses with sufficient potential for technological innovation)" companies, through establishment of a support system for each stage of their growth.
- Promoting the digitisation of SMEs: Establishing an infrastructure of systematic support for information-based management of SMEs.
- Laying the foundation for re-launching venture firms: Fostering an environment conducive to attracting investment and expanding trust in the government's venture policies.
- Assisting SMEs in achieving stable and self-reliant management: Timely supply of policy funds to ease the possible financial burden, while expanding loan guarantees.
- Supporting the marketing activities of SMEs: Encouraging public institutions to purchase SMEs' products and assisting SMEs to strengthen their export capabilities.
- Assisting small merchants and industrialists: Strengthening supports for small merchants and industrialists, including women entrepreneurs, to increase productivity and well-being in the society, while raising the living standards of the middle class.

The Ministry of Commerce, Industry and Energy is committed to incorporating e-Business in the six key industries. It intends to build a B-to-B network in the six key areas, while at the same time expanding it to other industries (see tables 44 and 45).

TABLE 44
STATUS OF E-COMMERCE DEVELOPMENT IN SIX KEY INDUSTRIES
(In percentages)

	E-commerce progress/Stage		Core Tasks
	2000	2003	
Electronics	8.5 (early growth)	30.3 (entrenched)	<ul style="list-style-type: none"> Sharing standardisation Cooperating with leading firms
Automobiles	2.4 (beginning)	14.0 (growing)	<ul style="list-style-type: none"> Building industry-wide network (KNX) Enhancing competitiveness of parts industry
Shipbuilding	2.5 (expanding)	15 (early entrenched)	<ul style="list-style-type: none"> Building collaborative system for design & production industries Establish a culture of inter-company collaboration
Steel	2.3 (beginning)	14 (growing)	<ul style="list-style-type: none"> Led by Pohang Iron and Steel Company (POSCO) Early establishment of e-commerce system
Machinery	2.0 (beginning)	12.5 (growing)	<ul style="list-style-type: none"> Standardisation of classifications and codes Digitisation of parts industry
Textiles	2.0 (beginning)	15 (early entrenched)	<ul style="list-style-type: none"> Establish digital transactions Build co-infrastructure

Source: Ministry of Commerce, Industry, and Energy (MOCIE).

TABLE 45
**INFORMATISATION PROJECTS OF MINISTRY OF COMMERCE,
INDUSTRY AND ENERGY**

	Major Project Features	Organisation
Supporting SME informatisation	Supports informatisation of SMEs (informatisation of work unit, distribution of ERP, building SCM, support building of e-learning)	Small Business Corporation
E-commerce promotion project	Develops and distributes e-commerce standards, nurtures e-commerce workforce, and carries out statistical reports and analysis	Korea Institute for Electronic Commerce
Building a digital industry area	Digitalizes national industrial area to provide comprehensive online administrative services to resident companies	Korea Industrial Complex Corp.
Building B-to-B network	Develops e-commerce model appropriate to each company	Korea CALS/EC Association
Operating e-commerce support centre	Designates 40 ECRCs nationwide, nurtures workforce and provides consulting and technological support, develops and distributes technologies for e-commerce	Electronic Commerce Resource Centre

Source: Ministry of Commerce, Industry, and Energy (MOCIE).

2. Small and medium business administration projects

The SME-support policies of the Small and Medium Business Administration (SMBA) are directed toward:

- Building a comprehensive technology support system through joint efforts by industry, academia and research institutes, aimed at strengthening the technological competitiveness of SMEs;
- Creating a climate conducive to growth of venture businesses, and expanding the productive investment base for venture companies;
- Promoting expansion of credit and loans to enhance the liquidity of SMEs;
- Efficiently resolving the manpower shortage of SMEs by expanding training opportunities or production workers, efficiently introducing foreign resources, improving the work environment of SMEs, etc.;
- Establishing measures to improve credibility of SME products and expand their distribution, in order to promote SME exports and increase domestic demand for their products;
- Supporting the start-up and management stabilisation of small businesses and women-owned enterprises;
- Expanding the information base and electronic commerce of SMEs;
- Innovating the process for efficient restructuring of SMEs and supporting the merger and acquisition (M&A) of SMEs and venture businesses; and
- Facilitating international cooperation activities, including trade, investment and domestic and overseas technology transfer.

The SMBA promotes informatisation projects primarily for manufacturing industries. The SMBA's support for SME informatisation is summarized in table 46.

TABLE 46
PROJECTS OF THE SMALL AND MEDIUM BUSINESS ADMINISTRATION

	Main Points
Digitising production information of SMEs	Supports informatisation utilizing workplace computers and IT
Supporting SME informatisation innovation consortium	Supports consulting service by forming a consortium with universities, system integration (SI) companies and related organisations
Building IT infrastructure in SME-concentrated areas	Supports building informatisation infrastructure for regional information hub in SME-concentrated areas
Building IT infrastructure for industry association	Builds e-commerce infrastructure for association-centred community
Training for obtaining informatisation management system certificates	Directs process of obtaining informatisation management system certificate, in order to transform management into informatisation management
Operating informatisation support group	Operates informatisation support group in order to solve SME informatisation problems
Surveying current status of SME informatisation	Conducts research on the current state of SME informatisation, in order to gauge the level of SME informatisation
Supporting total information management providers (TIMPs) (dedicated to innovative informatisation of SMEs)	Seeks SMEs with informatisation success to disseminate experience to other SMEs
Developing standardized model of work process	Expands and distributes standardized work process for all industries
IT education for SMEs	Provides informatisation education for SME workers and CEOs

Source: Ministry of Commerce, Industry, and Energy (MOCIE).

a) Export promotion

Exports by SMEs account for 43% of total exports and are growing at a faster rate than those of large corporations. However, the recent slowdown in the global economy and increasing competition are posing challenges to SMEs' efforts to expand their export activities. SMEs are also facing sluggish domestic demand as a result of the slowing domestic economy. Measures are therefore being sought to enhance the export competitiveness of SMEs and to bolster domestic demand.

In order to boost the mid- and long-term competitiveness of exporting SMEs, the SMBA is conducting activities to promote strategic export products, based on extensive market research by country and region. To that end, the aim is to develop "global" products by providing package support for technology development, overseas marketing, and export financing for companies producing these strategic export products.

The SMBA is also working toward expanding the export base for SMEs and providing active assistance in their overseas marketing efforts. Examples include practical training on trade, provision of export consulting to export companies, as well as the selection of ten export management companies for transfer of know-how on areas such as negotiations with overseas companies, execution of export contracts, and shipping, directed at companies that have recently begun to export.

The SMBA's work in this field also includes increased support for opening up new overseas markets. This takes the form of expanding opportunities for cooperatives and organisations dealing with parts, materials and machinery, areas with good export potential, to attend overseas exhibitions. It includes initiatives to dispatch talented human resources from SMEs to countries overseas to develop their expertise as trade professionals through on-site training in the local market. In addition, road shows are held to provide assistance to companies likely to enter overseas markets, providing them instruction in quality inspection and other procedures.

As a step toward consolidating the base for cyber trade among SMEs, the ASEAN+3 SME Network was launched in March 2003, laying the groundwork for stronger cooperation among the member countries. In addition, efforts to construct an Integrated System on International Procurement have been pursued, in order to provide international bidding information and facilitate the establishment of an online bidding system.

b) Trade facilitation

SMBA and SBC have combined to designate 38 overseas assistance centres to provide comprehensive trade-related services, such as market surveys and investment guidance, to Korea's venture enterprises. The centres are in established markets such as China (12 locations), United States (6), Japan (4), and Germany and Russia (3 each), as well as in newly emerging markets such as Brazil, Kenya and India.

The overseas service centres serve alongside Korean consulting companies and overseas branches of venture capital companies that have extensive experience and are well-connected with counterparts in each market. The centres will provide a base for information, marketing, matchmaking and buyer identification. So far, 142 small, medium and venture firms have taken advantage of the services.

E-Trade is trade in goods and services carried out internationally by electronic and information-intensive means, using IT, including via Internet. In this context, e-Trade is a process combining IT infrastructure, related industries, supporting laws and institutions, enterprises,

trade-related organisations, etc. E-Trade is a core strategy for enhancing national competitiveness through structural innovation of trade, which is the backbone of the Korean economy.

The aim is for Korea to achieve a leading e-Trade position in the 21st century through “e-Trade Korea,” by offering the venue and services for all enterprises to trade efficiently and effectively using the Internet, which provides access anytime, anywhere.

In the last 10 years, an e-Trade base has been established through the coordinated efforts of the government, related public organisations, and enterprises. Trade digitisation networks have been established through efforts in commercial business, foreign exchange management, customs processes, logistics, etc., since 1992. (E.g., KTNET, Korea-Japan/PAA network.)

TABLE 47
EVALUATION OF KOREAN E-TRADE PROGRESS BY PROCESS
(In percentages)

Process	Task/Activity	Progress (%) ^a
Market survey/ partner search	o E-general trading company operation	30
	o Trade information portal system	40
	o Overseas correspondence system	10
Consulting/ credit survey	o Linking credit information	5
Contract	o International mutual recognition system	5
	o Revision of laws for electronic contract	5
Business/ exchanges	o E-L/C system	5
	o Electronic civil service	40
	o E-C/O-issuing system	20
Logistics	o E-L/G circulation system	70
	o E-B/L circulation system	10
	o Logistics transport status system	10
	o Logistics partner solution development	10
Customs process	o Internet-based customs process	30
Payment	o Electronic payment system for extra expenditures	10
	o Solution and certification monitoring of international payment	5
	o Q/A payment system usage	15
Platform	o Integrated e-Trade platform	10
	o Dissemination of integrated trade solution	30
	o Global e-Trade network link	10
	o Standardisation of e-Trade documents	10
	o Domestic platform links	5
Laws/ institutions	o Trade BPR and ISP establishment	25
	o Improvement of commercial laws, regulation of financial documents, etc.	5

Source: Korea International Trade Association, (2002), Cases of IT-zation of Traditional Industries and Policy Implications: Focusing on Exporters, June.

^a Progress assessment in regard to the target set by the e-Trade Korea strategy as of 2004.

Internet marketing and trade information search systems have been well developed. (E.g., Silkroad21, KOTIS.) However, previous efforts have focussed on trade digitisation rather than on development of the entire e-Trade system at the national level. The low level of e-Business among SMEs, along with weak inter-firm cooperation, represent problems (80% of SMEs do not actively use e-Trade).

Table 47 shows an assessment of e-Trade progress in Korea, based on the related activities and processes. Overall, Korea has not made significant progress in e-Trade promotion; however, substantial achievements have been made in core activities.

The main strategies of “e-Trade Korea” can be summarized as follows:

- **Strategy 1: Construction of Internet-based e-trade infrastructure**

Allow trading enterprises to use the Internet system for the entire trade process anytime, anywhere. Establish a “single window” system, an integrated e-Trade Platform, with all government administrative services for trade business carried out online.

Establish e-payment and e-banking systems. Establish the EIPP (Electronic Invoice Presentation & Payment) system.

- **Strategy 2: Establish the base for e-trade utilisation by SMEs**

Promote e-general trading companies for assisting in searches and in matching trade partners, consulting, contracting, transactions, etc., on behalf of SMEs. Strengthen SMEs’ international marketing efforts by combining on- and off- line activities

Develop “Silkroad21” as Korea’s formal national trade site. Support trade digitisation of SMEs. Support the development of new export products for global markets, such as digital products (games, animation, etc.), S/W, DB and knowledge-based services.

- **Strategy 3: Establish global e-trade network**

Complete the Korea-Japan/East Asia e-Trade Network through Pan Asia e-commerce Alliance (PAA). Make Korea Trade Network (KTNET) a focal point for Korea. Apply the results and experiences of the Korea-Japan e-Trade Network to PAA, which is expected to begin operations at the end of 2005. PAA was formed in 2000 and consists of Korea, Japan, China, Chinese Taipei (Taiwan Province of China), Hong Kong (China), Singapore and Malaysia. Also important is participation in the APEC and ASEM paperless trade project.

- **Strategy 4: Reform of laws and institutions for e-trade-friendly business environment**

Creating an effective e-Trade process through comprehensive BPR (Business Process Reengineering), and establishing a system for electronic circulation of securities, such as B/L and insurance securities. Also included are removing legal and institutional bottlenecks in e-document circulation.

- **Strategy 5: Establishing efficient organisational system for the implementation of e-trade strategy**

It was anticipated that an “e-Trade Committee” would be established under the Prime Minister, as a public-private joint coordinating organisation. This committee was established recently. The committee consists of relevant ministers, along with representatives of related industrial associations and private organisations. Under the committee, an “e-Trade Working Group” has been formed to implement projects, divided up according to industry and based on the functional processes involved.

The role of e-Trade intermediaries is important to the successful implementation of the strategy. However, most of these are SMEs and have problems securing the necessary budget and resource, as indicated in table 48.

TABLE 48
BOTTLENECKS FOR E-TRADE PROMOTION BY INTERMEDIARIES
(In percentages)

	Total	Intermediaries			
		Finding partners	Finance	Logistics/ Customs	Other
Shortage in budget	38.6	66.7	25.0	30.7	38.9
Insufficient recognition of managers	22.9	11.1	41.7	23.1	19.4
Insufficient IT environment and manpower	10.0	11.1	-	23.1	8.3
Legal and regulatory barriers	28.5	11.1	33.3	23.1	33.3

Source: Korea Trade-Investment Promotion Agency (KOTRA), 2002.

c) FDI promotion

The role of FDI in Korea has been relatively minor. After the financial crisis in 1997, however, the government initiated tax reduction measures for high-tech businesses, businesses in foreign investment zones, and service businesses (consisting of exemption from, or reduced, national taxes for 10 years and local taxes for 15 years) to cope with the economic recession. Rent reduction policy is also underway in industrial complexes for foreign companies, at 25 national industrial complexes, and in foreign investment zones (100% exemption for high-tech businesses and 75% reduction for general manufacturing industries). M&A activities have been permitted since May 1998 (see table 49).

Along with such measures, certain limitations on foreign investment in the telecommunication services markets were lifted. Currently, there are no ceilings on foreign ownership of special and value-added telecommunication service providers. And the ceiling on single-person ownership of facilities-based service providers has been abolished, except as regards Korea Telecom. Foreign aggregate ownership, of up to 49%, of facilities-based service providers is allowed. Acquisition by a non-telecom company is now also permitted. There is no foreign ownership ceiling on IT equipment and software businesses.

Such liberalisation policies have produced a rapid increase in the inflow of foreign capital to the domestic IT industry. A number of multinational companies have made inroads in the Korean IT market, and this is expected to contribute greatly to the revitalisation of the Korean economy.

TABLE 49
FOREIGN DIRECT INVESTMENTS IN THE IT SECTOR (1997-2000)
(In billions of U.S. dollars)

	1997	1998	1999	2000
FDI	0.38	2.02	2.30	2.74

Source: Ministry of Information and Communication (MIC).

d) Business promotion (new business, incubation, entrepreneurship)

The government will encourage major industries, such as machinery and electronics, to develop information databases of the industries, along with integrated industrial information search systems. The government will also encourage SMEs to organize associations for community-type B-to-B e-commerce on a small scale to stimulate e-commerce of SMEs and to build the infrastructure necessary for the informatisation of SMEs.

(i) Creating the climate for promotion of venture business

One of the key components of the venture business support policies is the establishment of a solid base for fostering venture companies. This includes efforts to step up the functions of private sector institutions, including the Korea Venture Business Association, and to build a network among venture business-related organisations. Additionally, in order to facilitate the active M&A of venture companies, measures have been taken to improve relevant laws and regulations, including the Commercial Law, the Tax Law, and the Securities Exchange Act.

Another important aspect of these policies focuses on expanding the basic infrastructure for investment in venture businesses and improving the investment climate. To this end, the SMBA is initiating a variety of programs to build a foundation for the stable growth of venture capital, including the formation of the “Fund of Funds” for the financing of venture funds, and the shaping of an active secondary market for venture capital. In addition, the SMBA is holding investment fairs overseas to attract foreign investment and promote Korean venture businesses, while working to improve the registration screening process and operations of the KOSDAQ market, in order to expand the investment base for venture businesses.

To help facilitate the start-up of venture companies, SMBA is seeking to improve the regulations regarding their establishment and to build a system of information sharing. Moreover, to create an atmosphere conducive to the active start-up of new venture businesses, start-up exhibitions are being held and assistance is being provided to academic business start-up associations. Measures are also being taken to develop business incubators (BIs) into Post-BIs.

In an effort to foster the regional venture business, “districts for promotion of venture business development” have been designated to support venture companies located in regional areas. Furthermore, to encourage and facilitate the entry of Korean venture companies into overseas markets, Overseas Venture Business Support Centres have been established, while support programs, such as the US Small Business Innovation Research (SBIR) program, are being utilized to assist companies in entering overseas procurement markets. Additionally, support is being provided for local marketing of products by operating logistics warehouses and after-sale service centres.

(ii) Solidifying the base for establishment and stable management of small enterprises

A key component of support for small businesses relates to their management stabilisation. The specific measures taken to this end include: assistance, by small merchants and industrialists, in the start-up of small businesses, and provision of consulting through the 60 Small Business Development Centres nationwide; simplification of procedures for small enterprises to establish factories, along with stronger financial support; operation of a commercial lease protection program for small business owners doing business on leased properties; support for start-ups by minorities, including the handicapped, the elderly and ex-convicts; and promotion of the traditional culture industry by providing PR support and assisting with the industry's participation in international exhibitions.

Encouraging active start-ups of women-owned businesses and improving their competitiveness also constitute a major step in this arena. Various support activities are being carried out, including the organisation of start-up-related lectures and competitions through women's business incubators located across 14 regions, the operation of funds dedicated to women-owned businesses, and rectifying discriminatory practices against women.

(iii) Enhancing the information capabilities of SMEs

In order to strengthen support for information innovation among SMEs, the SMBA is operating the Total Information Management Providers (TIMPs) program, to assist SMEs in their efforts to build and operate efficient information systems. Additionally, information consortia have been formed around the professional IT organisations in each of the different regions. Information business process standards, by industry sector, and analytic indicators of the effects of investment in information, have also been developed.

Efforts are also under way to build a stronger foundation for information-based management of SMEs, including support for construction of information infrastructure by region and industry in areas of high SME concentration; support for construction of e-commerce systems at SMEs; provision of information technology training to employees of SMEs; and recognition and dissemination of best-practice cases involving SME informatisation, by holding SME information conferences and organizing observation visits to best-practice SMEs. Additionally, assistance is being provided in building information systems for SME production sites, while there continues to be monitoring of the factors that undermine the informatisation efforts.

SMBA established mid- to long-term strategies on SME informatisation, while providing on-the-spot support to SMEs for professional research and assistance. Further, it has secured a digital administration infrastructure in line with the concept of e-government, and is currently operating an online system for the handling of civil affairs requests.

(iv) Facilitating restructuring and competition of SMEs

The SMBA is expanding its support for SMEs to increase facilities investment for process automation and enhanced productivity, and by taking steps to improve regulations to encourage active M&As among SMEs and venture companies.

The functions of the Korea Federation of Small and Medium Business and its members are also being stepped up to promote efficient management by providing varied levels of assistance based on companies' operations and performance.

(v) Promoting international cooperation for SMEs

In order to enhance international cooperation of the SME sector, efforts are being made to identify changes in the global economic environment, promote cooperation through international organisations, and increase bilateral cooperation with other countries.

More specific measures for SMEs include strengthening SME-related cooperation with countries that have signed SME cooperation agreements with Korea (namely, the U.S., Russia, Singapore, Indonesia, Italy and Mongolia), and seeking new opportunities for cooperative relationships with other countries. In addition, global cooperation activities based on free trade are being promoted in order to expand trade and investment by SMEs and to further encourage the exchange of technology and information.

C. Special measures to correct the ‘digital divide’ between companies

The Act to Eliminate the Digital Divide (2002) defines digital divide as the difference in access to telecommunication services because of economic, regional, and social conditions, or difference in the opportunities to utilize telecommunication services. According to a survey by the SMBA in 2003, the level of informatisation among SMEs is roughly 70% of that in large firms. This means that SMEs are in a weak competitive position when dealing with larger firms. In 2003, the Korea Agency for Digital Opportunity and Promotion was designated as the organisation charged with overseeing the elimination of the national digital divide. The institute introduced a five-year plan to eliminate the digital divide. This includes policies and measures aimed at:

- Enhancing information accessibility by those excluded from information use
- Supporting technology and content development for reducing the digital divide
- Educating people in the use of information
- Increasing social awareness of the digital divide
- Promoting the productive use of information and preventing its misuse
- Fostering international cooperation

The problems of SMEs include insufficient budget for informatisation and for SME solutions, inadequate IT manpower and weak business structure. Although the government has been trying to strengthen the information capability of SMEs through various measures, it may take considerable time to achieve the targets that have been set.

1. Human resources

With the emergence of new IT businesses and the steering of traditional industries into the IT sector, the demand for skilled labour is increasing rapidly. There is currently a shortage of approximately 40,000 skilled workers in the IT industry. This labour shortage is expected to reach as high as 140,000 workers by 2005.

To overcome current and future shortages, the government has invested in support for education in the information and communication area, establishment of a technical high school specializing in software development, and basic research in related subjects. In addition, the government has provided support for the development of a University Information and Communication Research Centre, an Information and Communication University Overseas Scholarship Program for ASIC design, and JAVA training. The government has also sponsored information and communication re-training courses for unemployed persons from traditional industries who have extensive academic backgrounds. In addition, government support has been provided to IT professional education organisations and cyber universities involved in the field of information and communications, while invitations have been extended and training offered to foreign IT specialists and experts. To further develop human resources in the IT field, the government has provided computer literacy training and education aimed at elementary and middle schools, housewives, the military, and the disabled.

The government plans to invest in increasing the involvement of educational organisations in information and communication education, as well as promoting cooperation with overseas schools and universities. The government also plans to sponsor the retraining of industrial workers, bridge the digital divide among the population, and develop a highly skilled workforce for the IT field. The government expects to expand its investment in identifying gifted IT talents in their early stages and nurturing them so that they can contribute to the world economy.

The shortage in e-Business manpower reached 96,000 persons in 2003 and is expected to reach 215,000 in 2007. This shortage is expected to increase annually. In order to solve this shortage problem, various training and education programs were initiated. Thus, the “e-Business Manpower Development Centre” was established for training experts in the field. The program consisted of four intensive courses: e-Business Planning, ERP, CRM and SCM. In 2003, Mobile Business and e-Document courses were added (see table 50).

TABLE 50
DEMAND AND SUPPLY OF E-BUSINESS MANPOWER
(In number of persons)

	2003	2004	2005	2006	2007
Demand	888 719	985 683	1 070 854	1 176 541	1 306 544
Supply	792 501	865 371	939 966	1 015 098	1 091 078
Shortage	96 218	120 312	130 886	161 443	215 466

Source: MOCIE, 2004, e-Business white paper 2004.

Note: These are real numbers for 2003, while for other years they are projections.

Low wage levels and poor working conditions at SMEs have resulted in a critical shortage of manpower, which is one of the biggest challenges faced by SMEs. To overcome this, fundamental measures are being sought to secure resources for SMEs and to build infrastructure for the stable supply of manpower, based on a wide range of support, including the provision of structured training programs for SME employees.

To help resolve manpower shortages among SMEs, the SMBA is moving forward with efforts to build a structure to provide manpower support to SMEs. These efforts include enactment of the Act on Special Measures for Human Resources Support to SMEs, slated for the latter half of this year, as well as the distribution of advanced human resources (HR) management manuals and recognition and expansion of companies with good HR practices.

Nurturing and employment of skilled resources by SMEs is also an important factor. To facilitate this process, SMBA is providing support to provide technology training to the employees of SMEs, expand remote education via the Internet, and introduce highly skilled personnel from advanced countries.

The problem of poor working conditions at production sites is also being addressed through measures to improve the working conditions at SMEs, including support for the development and distribution of equipment for alleviating adverse conditions, such as heat, odor and dust, that discourage people from working at these sites. Facilities funds to enable plant automation and process improvement are also being provided.

These efforts are being accompanied by steps to encourage employment at SMEs and to change the way the younger generation perceives these firms. The Bizcool Program for technical high school students, and on-the-job internships and employment for college and technical high school students, are two examples. Providing customized training, holding regional job fairs and building a human resources information network are also included in the list of measures for obtaining a stable source of manpower for SMEs.

To this end, the government supports various multi-level IT training courses. For unemployed persons with high-level academic backgrounds, training programs in IT are provided, reflecting the demands from companies charged with hiring workers. By expanding

field training programs, with cooperation between companies and schools, the government expects to increase job opportunities and improve job qualifications for the unemployed.

Establishment of the electronic employment information system helped 1.9 million people obtain jobs between 1999 and 2001 by providing comprehensive employment information regarding job openings, vocational training programs, etc.

The government plans to support employment and small business start-ups in the IT field through a complete online IT education system for women, to be instituted by 2006, and by developing programs that can be readily applied to the IT industry. To promote the start-up of small businesses by women, the government plans to develop new training programs and search for new industries and knowledge-intensive fields. In order to increase employment opportunities for the elderly, the government plans to develop programs for job retraining in the IT field.

2. Technical aspects

- **Facilitating technology innovation of SMEs**

As part of its efforts to expand the infrastructure for supporting the technology innovation of SMEs, the SMBA is working to establish a government-level SME Technology Innovation Promotion Plan, and is gathering SME technology-related statistics on items such as technology development resources, technology development investment, technology competitiveness, and technology development performance. Additionally, included in the framework for support is the promotion of international technology cooperation by SMEs through joint technology development efforts with foreign universities and research institutes, as well as the intensive promotion of innovative businesses (“Inno-Biz Program”) and an active search for strategic technologies for SMEs.

Various measures have been put in place to efficiently assist SMEs in technology development. These include greater support for joint technology development by the industry, academia and research institutes, and increased follow-up management; support to regional SMEs for technology transfer and marketing based on university technology transfer centres; and support for new product development that SMEs undertake in connection with government procurement activities.

Recognizing the importance of improved productivity for innovation among SMEs, the SMBA is also committed to implementing support programs to facilitate process innovation, providing management consulting to promising SMEs, and assisting export companies and companies with outstanding technologies obtain international standards certification.

Due to high costs and low returns, telecommunications service providers are unwilling to expand broadband networks to rural areas. To solve this problem, the government provides an incentive to service providers so that remote regions, such as rural areas, islands and mountainous regions, will have access to information comparable to that found in larger cities.

3. Financial aspects

As of 2003, in order to improve SMEs’ access to capital, the SMBA is coordinating a 2.8 trillion-won policy fund. Fund assistance to SMEs by the SMBA takes the form of either loans or investment. Loan-type assistance includes direct loans to SMEs and indirect loans via commercial banks. The details of such assistance activities are entrusted to the Small Business Corporation (SBC).

To create an environment for stable funding of SMEs, efforts are being made to simplify the procedures for SMEs to obtain policy-fund assistance. At the same time, efforts are underway to expand financial assistance for special purposes, such as export and technology development. In addition, financial institutions are being encouraged to extend loans or credit based on their own credit evaluation, rather than relying on the presence of collateral, while asset-backed securities (ABS) for SMEs are being issued through the acquisition of corporate bonds and credits. Measures are also being taken to enable efficient risk management at SMEs and to improve business management. For example, the SMBA is planning to construct a foreign exchange trading system, in concert with financial institutions, for small and medium exporting companies that are exposed to foreign exchange risk.

Providing credit guarantees to SMEs is another important means of financial support. In order to increase the benefits of this mechanism, SMBA plans to build up a guarantee fund amounting to 40 trillion won, while simplifying the screening process and promoting advancement of the credit-guarantee infrastructure by establishing a cyber guarantee system. Moreover, methods are being sought to ensure systematic management of guarantee risks and to efficiently deal with compensation receivables.

- **Venture capital industry**

In Korea, the venture capital industry was formed through policy initiatives beginning in the early 1980s, well before there was public awareness of start-ups. In the early stages, the venture capital industry served the role of carrying out the government's policy of providing funding for small and medium enterprises, focussing more on loans than on investments. However, the opening of the KOSDAQ in the mid-1990s opened up ample new opportunities for investments, when the venture boom in the IT sector led to a remarkable growth in the venture capital industry. There were 145 venture capital firms as of the end of December 2001. In recent years, investment in the IT industry has accounted for close to two-thirds of all investments.

The government has assumed the role of leading investor in newly formed venture investment funds to facilitate the supply of funds, especially during the period of economic recession following the second half of 2000. In addition, by reducing income taxes and capital gains taxes for fund investments, the government has encouraged venture investments. Currently, the government agencies involved in venture investment funds include the SMBA, the Ministry of Information and Communication, and numerous other central government ministries and regional government offices.

4. Infocentres

The government is now supporting the establishment of free Internet facilities at community centres for low-income areas and remote regions, such as islands. At the end of 2002, almost all towns and villages had at least one centre offering free Internet access.

As part of efforts to stimulate digital management by small and medium enterprises (SMEs), SMBA has decided to support ASP (Application Service Provider) types of e-Business solution projects, following the selection of four small business consortiums.

The four business consortiums selected by SMBA are: Korea Agriculture & Food Trade Cooperative (KAFTC) (members: 160, associate members: 4,200); Korea Crafts Artist Association (KCAA) (members: 350, related members: over 600); Korea Association of Advertising Specialty Suppliers (KAASS) (members: 11,154); and Korea Fashion Textile Association (KFTA) (members: 184).

SMBA's support package for e-Business, specialized by sector, includes partial financing for development of solutions, publicity for related business sectors and firms, and guides to system utilisation.

The e-business solutions suggested by each business group are:

- KAFTC: Portal to support its members, production history management system, food safety management system, management-support ASP, shopping mall builder, etc.
- KCAA: Association portal, common purchases/sales, support for community and knowledge services, auction of craftworks, cyber expo, etc.
- KAASS: Association portal, e-marketplace, ASP support (inventory/business partners/sales management), online payment settlement, UMS, etc.
- KFTA: Textile information portal, business information-sharing system (management of materials, quotations and delivery time, and consultations), etc.

5. Others

The government's goal is to achieve a 90% penetration rate for the entire population for Internet usage by 2006. To this end, the government will continue basic computer literacy programs for the information have-nots. Those who have completed the basic programs will have access to more-advanced programs.

In particular, the government plans to strengthen and expand the present distance IT education system, in order to make it a leading national IT education portal, and to provide IT education for seeking employment, starting a business, counselling, etc.

The government will introduce a mobile working system in areas involving field work, such as social welfare activities. To promote telework, the government will revise the current laws and regulations to protect the rights and interests of workers who utilize telework.

D. E-government aimed at SMEs and trade promotion

1. Overall strategy/structure of e-government

a) Creation of e-government

The creation of an e-government platform is essential if the country is to keep up with the evolving paradigm, which will change government practices and services in the 21st century. E-government will play a key role in expanding national competitiveness. An e-government initiative is the most effective citizen-centred system available to meet the needs of citizens and private businesses, and will provide high-quality and faster government services. Government will become more transparent, effective, and accountable through an e-government service, and will expand the use of information technology among citizens and private businesses.

Korea is striving to complete an e-government initiative based upon the current information network, which is the most advanced in the world.

To achieve a citizen-centred government, governments are making their services available to citizens throughout the world.

In November 2002, the e-government project was officially launched. Through a government-wide consensus, 11 e-government initiatives were established in 2000 and were completed within two years. E-government services allow citizens to apply for government services and access personal records stored in the government database, all via the Internet.

b) Major initiatives of e-government

Government records of resident registration, real estate, vehicle registration, private businesses, and personal taxes are vital to individual citizens. The Government for Citizens (G-for-C) System, integrates these government records into an information sharing system and combines various Internet-based government agencies into a Single Window e-Government System. The G-for-C system interconnects the database networks residing in the Ministry of Government Administration and Home Affairs (MOGAHA), Supreme Court of Korea, Ministry of Construction and Transportation (MOCT) and other government agencies that store independent government records of resident registration, real estate, vehicle registration and other areas. The aim is to streamline government processes in delivering services to citizens. The results attained from the G-for-C system have included substantial reductions in document submissions, through making government services available via the Internet, and provision of government administration information. Citizen participation in government has also been increased.

TABLE 51
MAJOR E-GOVERNMENT INITIATIVES

Objective	Main Features
Upgrade government-wide services for citizens and private businesses	<ul style="list-style-type: none"> a) Information sharing in five major government service areas, including resident registration, real estate, vehicle records, etc. Creation of the Government for Citizens (G-for-C) system to establish a government-wide service processing system. b) Establishment of a Social Insurance Information Sharing System (SIIS) for health insurance, pension insurance, unemployment insurance, and industrial accident compensation insurance. c) Built: a Home Tax Service System to enable online filing of tax returns, e-bill, e-payment, tax consultation and issuance service for tax-related certificates. d) Establishment of a Government e-Procurement System to achieve transparent procurement processes.
Improve the effectiveness of administration	<ul style="list-style-type: none"> a) Built: a National Finance Information System (NAFIS) for budget planning and allocation, accounting and settlement of accounts, making financial information available via an interagency network. b) Built: a National Education Information System for the electronic distribution and management of records across schools, offices of education and the Ministry of Education & Human Resources Development. c) Proceeded with the Local Government Information Network System Project for 21 service areas. d) Built: a Personnel Policy Support System (PPSS) to manage the hiring, promotion, and compensation of civil servants in a fair and systematic manner.
Establish an infrastructure for e-government	<ul style="list-style-type: none"> a) Expanded the use and distribution of e-Approval and e-Documents between agencies. b) Expanded the use of e-Signature and of the e-Seal System to establish reliable e-administration. c) Built: a Government-wide integrated computer network in project-specific stages. (Since November 2002, the redesign plan for work processes and the strategic plan on information technology have been formulated.)

Source: Ministry of Commerce, Industry, and Energy (MOCIE).

The Home Tax Service (HTS) system, via the Internet, allows taxpayers to file tax returns, receive e-Bills, and process e-Payments from their homes via the Internet. With the establishment of the Government e-Procurement Service (GePS), procurement processes involving bidding, contract agreements, and payment for services or supplies take place online in real-time. At the same time, the National Finance Information System (NAFIS) offers real-time financial information to high-level government officials by interconnecting the independent financial systems residing in each public agency. The database networks for health insurance, pension insurance, industrial accident compensation insurance, and unemployment insurance policies, representing the 4 major social insurance systems in Korea, have been interconnected into a seamless network (see table 50).

2. Some applications

a) E-procurement

Informatisation of government procurement services through the introduction of online services enhanced the productivity and transparency of these services by reducing the time required to process documents (from more than 2 days to less than 30 minutes).

b) Customs and other trade-related procedures

Informatisation of customs services has shortened the processing time (for exports, from more than a day to less than two minutes; for imports, from more than two days to less than two and a half hours), and has reduced logistics costs by at least 500 billion won per year.

(i) Policy plans for advancing B-to-B e-commerce

Providing detailed information regarding foreign e-marketplaces: The government is planning to provide information concerning document and catalogue standards, and commodity standards for each e-marketplace. In addition, the government will provide specialized services to assist in resolving potential disputes resulting from international trades.

Providing an environment for paperless international trade through the establishment of an integrated system of international trade automation suitable for the Internet: The government will distribute EDI systems to all exporters, and remove potential obstacles to international trade automation. The government will implement a global e-Trade network project to handle all processes associated with international trades, including intermediation, contracts, payment and logistics. The network will be linked to the international trade automation systems of other Asian and European countries. As a result, a trade environment will be provided in which any international trader can utilize e-Trade.

(ii) Policy plans for providing a safe and reliable online business environment

The government will promote the implementation of a certification system, while encouraging self-regulation of the private sector. Online trade usually involves consumer risk, since the quality of the commodity cannot be verified prior to purchase. To minimize these risks, the government will provide online quality information concerning trade products. For commodities for which online trades are delayed due to uncertainty as to quality, the government will establish a certification system. In addition, the government will encourage self-regulation and self-monitoring measures within the private sector. By providing information on the quality of agricultural and fisheries goods, the government will encourage the production and distribution of safe, high-quality products.

c) E-finance and/or e-payment

(i) Policy plans for advancing B-to-B e-commerce

The logistics system will be linked to relevant systems such as the financial information system.

The government plans to construct advanced logistics systems based on ITS and GIS, and also establish real-time logistics systems through linkages with wireless telecommunications networks. To accomplish this, the government will construct, in stages, a new infrastructure, such as wireless telecommunications networks utilizing UHF, while taking full advantage of the existing infrastructure, including current mobile telecommunications networks, satellites and broadcasting networks.

In order to secure the safety of e-money, a personal identification system and a security management system will be introduced. The government will revise laws and regulations related to e-payment to ensure a reliable and safe environment for e-commerce.

(ii) E-payment service

The e-commerce market is divided into B-to-B and B-to-C business. Auctions, online group purchases at an e-retailer, and name-your-price websites are some of the various new forms of e-commerce that have appeared on the Internet. Electronic payment markets for online purchases are growing rapidly. The electronic payment business became a 16.68 trillion-won market in 2002, posting a 31% increase over 2001. In 2003, the business is projected to grow to 24.71 trillion won. The most common electronic payment method is the use of credit cards. Other electronic payment methods are Internet Secure Payment (ISP), which is based on e-commerce authentication, wire transfers, payment over mobile phones, e-Money, and the use of membership card points to purchase goods online.

The electronic payment business has developed into an independent business that is separate from the banking and finance industry, while forging closer industry ties with wireless carriers.

(iii) Internet banking

As of September 2002, the number of subscribers who had signed onto Internet banking services reached 16.94 million. Most banks lowered their fees for bank wire transfers for people using this service on the bank's websites. This strategy has attracted many subscribers and banks have since introduced new banking services such as the Electronic Bill presentment and Payment (EBPP) service, loan services via the Internet, integrated balance statements for people with several bank accounts, bank wire transfers via the Internet, and e-Customer Relationship Management (e-CRM) services. Approximately 17.71 million people had signed onto Internet banking services offered by the post office and by each of the domestic banks, Citibank and HSBC, as of the end of December 2002. This represents an increase of 56.5%. In 2001, approximately 390,000 companies were using Internet banking services, and in 2002 the number of companies jumped to 690,000.

Internet banking is now one of the four most-used financial services, along with CD/ATM withdrawals, telebanking, and bank teller services.

A survey of the mobile Internet banking industry shows that 18 Korean banks were offering mobile banking services as of December 2002. During December 2002, more than 1.09 million transactions were completed through mobile banking, compared to 900,000 transactions in September 2002.

d) Others

- Policy plans for advancing B-to-B e-commerce

Enhancing productivity and transparency through informatisation of all business activities: Promoting information sharing and cooperation among firms located in a single value chain to stimulate c-Commerce (collaborative commerce), and to enhance both productivity and transparency.

The government will develop and deploy systems supporting c-Commerce and the optimal algorithms for efficient interfirm cooperation. The government will promote pilot projects for e-commerce, with prospective SMEs as targets for these projects. To ensure smooth B-to-B e-commerce and information sharing, there need to be efficient interfaces, with standardisation of data and protocols.

Expanding B-to-B networks: The government is expecting that by 2006, e-commerce will represent 30% of all transactions in six core industries, including electronics, automobiles, ship building, steel, machinery, and textiles, and 25% in the remaining industries. The government will support the construction of B-to-B e-commerce infrastructure, such as standardisation and e-Catalogue for each industry. By 2005, more than 50 industries will have constructed their B-to-B network.

Logistics system improvement: The logistics system will be linked to relevant systems such as the financial information system. The government plans to construct advanced logistics systems based on ITS and GIS, and to establish real-time logistics systems through linkage with wireless telecommunications networks. To accomplish this, the government will construct, in stages, a new infrastructure, such as wireless telecommunications networks utilizing UHF, while taking full advantage of the existing infrastructure, including current mobile telecommunication networks, satellites and broadcasting networks.

E. Institutional issues

1. Standardisation, such as codes for EDI and cryptography

The government has promoted the establishment of standards regarding networking between industries, IT-related industries, banking, distribution, transportation, and manufacturing industries. The government will lead the development of standard-setting for next-generation core technologies in five strategic e-Business services: SCM, CRM (Customer Relationship Management), ASP, EBPP (Electronic Bill presentment & Payment), and e-Market place. While reflecting the trends of international standards in the development of these technologies, the government will promote outstanding domestic technology as an international standard.

- Promoting standardisation in information and communications

In order to provide a favourable environment for information and communication usage and to encourage the IT industry to move into the global market, the Korean government has developed and disseminated information and communication standardisation criteria. Moreover, in order to improve the testing and certification systems in the telecommunications sector, the government has improved the operations that regulate technical standards, so as to address the rapid development of IT and changes in the competitive structures of the telecommunications market. To this end, in August 2001 the government revised the regulations of the Technical Standards for Telecommunication Facilities. In addition, the government is making improvements to the certification system for telecommunications equipment, and is promoting mutual recognition between nations, in order to overcome technical barriers to trade.

2. Key public infrastructures

- Research and development of network equipment for the high-speed information infrastructure

The development of network equipment technology for high-speed information infrastructure is divided into the HAN/B-ISDN and MPLS projects. The HAN/B-ISDN project concerns the development and marketing of asynchronous transfer mode (ATM) optical transmission equipment, which is a critical component of the high-speed information network. The government invested 685 billion won during the decade from 1992 to 2001 in these projects. The MPLS is a project that deals with the development and marketing of Multi-Protocol Label Switch (MPLS) technology to obtain functional improvement of the Internet ATM exchange. This project was injected with investments of 225.55 billion won from 1999 to 2001.

3. Intellectual property rights (IPRs)

Like many developing countries, Korea has been criticized for lax IPR protection in the past. However, the country has strengthened IPR protection tightly in the recent period. This stronger IPR protection is due not only to overseas pressures, but also to domestic needs. As more and more domestic software products were produced, it became essential to protect IPRs in order to foster the development of the software industry. This phenomenon also applied to other industries.

Korea is still on the U.S. State Department's Priority Watch List. Despite the government's efforts to enforce IPRs, including copyrights, cyber crimes and violations of IPRs have been increasing.

The computer Program Deliberation and Mediation Committee (PDMC) plays a central role in the protection of software IPRs. According to a survey by PDMC in 2004, the use rate of (legal) genuine software products is 80 percent, which means that 20% of software products are illegally circulated in Korea.

The problem lies not in the law or institutional arrangements, since Korea has many different IPR-related laws and protection systems. Rather, it is the application of the laws that poses the problem, with people's mindset representing the most vital factor.

4. Others

a) Growing adoption of certificate authentication

In the Internet banking sector, certificate authentication is widely used to verify transactions. The establishment of the e-government in November 2002 has also helped the spread of certification authentication among Internet users, since without an authentication code many transactions are impossible. In addition, since the government has made the use of certificate authentication part of its policy in countering financial fraud, more people are using authentication codes.

b) Data security

In January 2001, the Korean government passed the Act to Promote the Utilisation of Information and Communication Network and Data Protection, aimed at protecting critical communication infrastructure and computer systems operated by key national industries —such as finance, telecommunications, transportation and energy— from computer hacking and virus

attacks. Eighty-nine networks have been designated as information and communication networks by the government in the period from 2001 to the present.

The Korea Information Security Agency (KISA) received 15,192 reported cases of hacking attacks from Internet users as of December 2002, as well as 38,677 reported cases of computer viruses. Hacking attacks have increased by 184.8% compared to 2001, while the number of reported computer viruses has decreased by 40.5% in that same period. During 2002, worm viruses brought the Internet to a crawl throughout the world, and spam mail became an issue among governments, with debates occurring as to how to regulate spammers.

The increase in the number of cyber attacks has prompted the MIC to take countermeasures in the form of an early warning system, which will alert Internet users about hacking attacks or the spread of new computer viruses, in cooperation with the Korea Information Security Agency (KISA). The Ministry also supports efforts of the Computer Emergency Response Team (CERT) to promote civic groups that are taking steps to make the Internet a safe place.

E-Signature is a logical combination of electronic data attached to an e-Document to confirm to the recipient the identity of the sender, while also containing information about any tampering or forging that might have been done to the e-Document. The authenticity of an accredited e-Signature is confirmed by a certification authority document and is issued by a licensed certification authority. The current technology of accredited e-Signatures is based on digital signature technology that uses asymmetrical encryption algorithms. In 2002, the first certification authority, Korea Information Certificate Authority (KICA), was established, and there are currently 6 accredited agencies (see table 52).

TABLE 52
ACCREDITED E-SIGNATURE USER STATISTICS
(In number of persons)

Accredited Certification Authorities	2000	2001	2002
Korea Information Certification Authority (KICA)	11 176	260 996	558 806
Korea Securities Computer Corp. (KSC)	28 182	281 634	748 840
Korea Financial Telecommunications & Clearings Institute (KFTC)	12 478	1 363 016	3 925 522
National Computerisation Agency (NCA)	-	11 992	485 388
Korea Electronic Certification Authority (CrossCert)	-	-	53 092
Korea Trade Network (KTNET)	-	-	857
Total	51 836	1 917 638	5 772 505

Source: National Computerisation Agency, Ministry of Information and Communication, 2003, White Paper Internet Korea 2003.

V. Regional networks

A. Existing regional networks or websites

As shown in table 53, the level of informatisation among SMEs in Korea is still low. The percentage of SMEs in the first and second stages of this process is as high as 78.1%. This implies that there are wide digital divides among SMEs.

TABLE 53
STAGE OF INFORMATISATION AMONG SMES IN KOREA

Stage	Level (points)	Distribution (%)
I. Introductory stage	Below 40	26.4
II. Business efficiency stage	40 - 60	51.7
III. Organisational informatisation stage	60 - 80	21.0
IV. Knowledge informatisation stage	Above 80	0.9

Source: Small and Medium Business Administration (SMBA).

Due to the lack of capital and manpower, SMEs do not have sufficient capabilities to carry out informatisation by themselves. Since 2002, the government has supported the Informatisation Innovation Consortium (Cluster) Program. During that year, 30 regional consortia were formed, consisting of 1,109 SMEs. It was anticipated that, in 2003, 40 consortia would support a total of 1,300 SMEs through the program. Government support represented as much as 80% of total expenditure. This support was for strategic consulting, utilisation consulting and infrastructure consulting.

B. New initiatives in the planning stage

Regional digital divides are still very wide in Korea, as shown by the results of the evaluation outlined in table 54. Each city or province has its own networks, centres and marketplaces for e-Business.

TABLE 54
INFORMATISATION EVALUATION BY SELECTED REGION
(In points at a maximum of 100)

City and Province	Evaluation
Seoul City	54.5
Busan City	44.6
Kyunggi Province	51.8
Kangwon Province	47.6
Cheonnam Province	44.7
Kyungnam Province	46.7

Source: Small and Medium Business Administration (SMBA), 2003, SME White Paper 2003.

SMBA adopted five major tasks for SME informatisation in 2003. Among these, the Informatisation Innovation Cluster Program includes the promotion of digitisation clusters by region. This will be operated in the form of a consortium or network involving regional universities, management organisations, existing firms, local government, IT enterprises, etc.

Support for the consortium includes not only ongoing support for the expansion of existing IT infrastructure, but also efforts to network the above-mentioned entities. The main target areas are regional industrial clusters, industrial complexes, apartment-type factories, and local SME-intensive areas.

As regional consortia develop and grow, an inter-regional network, serving as a nationwide link for cooperation among consortia, is expected to be established.

The present goal is to expand the bases of e-Business throughout the country, networking all companies in Korea to the Internet. The government will provide the necessary support for Internet access by SMEs. Networking SMEs will promote the formation of independent markets for SMEs and productive e-Businesses. In addition, the government will provide aid to SMEs that lack sufficient funding and technologies to adopt IT. This will involve providing the integrated services of ASPs (Application Service Providers), as well as meeting the informatisation needs of 30,000 SMEs. The government will construct a network for a comprehensive e-Business support system and provide services in concentrated industrial complexes.

C. Possibility of inter-regional links

Although inter-regional links for regional networking of SME e-Business have not yet been independently established, various organisations and programs fulfil this role and function in Korea. For example, public organisations in charge of SME informatisation have their own nationwide on- and off-line networking system. Special enterprises designated as Informatisation Innovation Enterprises also play similar roles, although they are industry-specific. Industrial associations and cooperative informatisation programs involving leading large firms and small suppliers could develop such a nationwide or inter-regional network.

VI. Conclusions and recommendations

The most significant policy of the Korean government in support of digitisation and e-commerce among SMEs is the “Thirty Thousand SME Informatisation” Project, which was launched in 2001 to strengthen competitiveness and innovation among SMEs through the use of IT. Over the last three years, the government invested 11 billion won to support informatisation of more than 30,000 SMEs. As a result, many SMEs have seen cost reductions and productivity gains. Combining IT with traditional industries helped SMEs to increase their competitiveness in relation to large domestic firms and foreign competitors in countries such as China. The project also helped SMEs develop better cooperative networks with large firms and among themselves.

The case studies in this report suggest several conclusions and lessons, which are summarized as follows:

First, utilizing IT infrastructure and government support programs, many SMEs in Korea have attempted to solve problems and eliminate barriers to digitisation of their businesses. The most important factors in success are the firms’ own motivation and initiative.

Second, hardware is only one aspect of the success. The culture and atmosphere of cooperation is equally important for successful e-Business or e-Trade. This culture cannot be developed solely by the government, but must be fostered through social institutions, education and the business environment.

Third, the portfolio and investment strategy of firms represents an important element. SMEs normally do not have a well-formulated strategy, and lack sufficient investment resources for informatisation. In a period when the IT boom has been dissipating, it is even more difficult to invest in IT. Government supports are often wasted on choosing the wrong targets, due to a lack of information.

The task of providing SMEs with the capabilities to use IT to enhance their businesses, as well as for trade, remains largely unfinished. This involves:

- Development of medium- and long-term technology for combining IT with traditional industries;
- Promotion of product development utilizing IT;
- Promotion of e-Trade; and
- Training manpower for IT applications.

Despite the proactive policies of the government and the efforts of related organisations and firms, e-Trade in Korea has not yet been developed sufficiently. Weak areas are found in: low utilisation of the e-General Trading Companies; low profitability of e-Trade service providers; low level of digitisation (particularly among SMEs); and insufficient infrastructure.

Since e-Trade is part of e-Business more generally, firms must have the mindset for e-Business and for overall development of e-Business in order for e-Trade to develop. Above all, Korea needs to establish more efficient e-Business infrastructure. In particular, SMEs need to actively utilize available support measures and policies. However, at present they lack the capacity to do so. Thus, the role of the e-General Trading Company should be strengthened.

Though Korea's progress in e-Trade development has not yet reached optimal levels, the accomplishments to date often seem impressive to outside observers. The active role of the Korean government in e-Trade development, through various policy measures, confirms the crucial role of government, particularly in regard to constructing needed infrastructure and establishing the appropriate legal arrangements.

References

- Economist Intelligence Unit (2004), E-Readiness Rankings 2003.
IT Industry Outlook of Korea (2002).
KISDI (Korea Information Strategy and Development Institute) several years.
Korea Association of Information and Telecommunication (2004).
Korea International Trade Association (2002), Cases of IT-zation of Traditional Industries and Policy Implications: Focusing on Exporters, June.
KOTRA (Korea Trade-Investment Promotion Agency) (2003), Survey on Status of Export Industries 2003.
MIC (Ministry of Information and Communication ROK) (2003), White Paper Internet Korea 2003, National Computerisation Agency (NCA).
_____ (2002), White Paper Internet Korea 2002, National Computerisation Agency (NCA).
_____ (2002), E-Korea Vision 2006.
_____ (2002), IT Korea 2002, Republic of Korea.
_____ (2000), White Paper Internet Korea 2000, National Computerisation Agency (NCA).
MOCIE (Ministry of Commerce, Industry and Energy of Korea) and Korea Institute for E-Commerce (2004), e-Business White Paper 2004.
National Statistical Office (2004), Survey Reports on E-Commerce Statistics.
SMBA (Small and Medium Business Administration, ROK) (2003), White Paper 2003.
_____ (2003), The 21st Century with Strong & Innovative SMEs.
_____ (2002), SMEs Policy in Korea 2002.